Shaw Environmental, Inc. (a CB&I Company)
11206 Thompson Avenue
Lenexa, KS 66219
913-451-1224
Fax: 913-317-2660

December 2, 2013

Mr. Lee Hammond
Environmental Site Remediation
Union Pacific Railroad Company
1400 Douglas Street, STOP 1030
Omaha, NE 68179

RE: Union Pacific Railroad Right of Entry
Former GST Steel Facility
Kansas City, Missouri

Dear Mr. Hammond:

On behalf of the Mile Rail, LLC (MileRail), Shaw Environmental, Inc. (Shaw), a CB&C Company, is submitting the enclosed application for access to Union Pacific Company Environmental Right of Way near milepost 1-50N/R32W in order to conduct Phase II investigation activities requested by the U.S Environmental Protection Agency (EPA).

This application for access is in support of ongoing Phase II investigation and Phase III removal action activities currently being conducted under EPA oversight on a portion of the former GST Steel facility located at 8116 Wilson Road, Kansas City, Missouri. The EPA is concerned that fluids containing polychlorinated biphenol (PCB) were released into the environment as the result of copper thieves discharging the contents of transformers house in a closed electrical substation located in the eastern edge of the former GST Steel property. Union Pacific is hereby notified that subsequent investigations indicated that PCBs migrating through the vadose zone have moved to the northeast onto the adjacent railroad right of way.

We request access to continue the investigation on the Union Pacific fight-of-way to the closed electrical substation in order to delineate the extent of the PCBs in the soil and shallow groundwater. This information will be used to evaluate potential remedial action options. Attached are the following:

- Completed application for Environmental Right of Entry Agreement form
- Check for $555 made payable to "Union Pacific Railroad Company – Federal Tax I.D. #94-6001323"
- CB&I project team contact information
- Environmental Site Plan (indicating investigation activities to date and proposed activities)
- Approved Work Plans
- Agency Directive
- Relevant site maps
- Monitoring well design, if required
- Railroad Protective Liability Insurance

RCRA

527526

If you have any questions or require additional information, please contact me at 913-317-3591 at your earliest convenience.

Sincerely,

Mark L. Finney, RG
Project Manager

Cc: Bruce Morrison, US Environmental Protection Agency

Attachment 1
Environmental Right of Entry Agreement

APPLICATION FORM FOR UNION PACIFIC RAILROAD COMPANY
ENVIRONMENTAL RIGHT OF ENTRY AGREEMENT

Please fill in as indicated. Please type or print clearly in all capital letters:

RESPONSIBLE PARTY / LICENSEE:

Company Name Mile Rail LLC

P O Box & Street Address 281 Woodcreek Ct.

City, State, Zip Code Commerce, MI 48390

State of Incorporation Missouri

Contact: (Name / Title) Ben Greenberg

(Phone / Fax) 619-405-9539

(email, if possible) bgreenberg@milerail.com

LICENSEE CONSULTANT (if applicable):

Company Name CB&I

P O Box & Street Address 11206 Thompson Ave.

City, State, Zip Code Lenexa, KS 66219

Contact: (Name / Title) Mark Finney, Project Manager

(Phone / Fax) 913-317-3591

(email, if possible) mark.finney@CBI.com

SITE LOCATION (include City / County / State) 8116 Wilson Rd., Kansas City, MO

RAILROAD MILEPOST AND SUBDIVISION Near Milepost 1-50N/R32W Section 31 South of Neff yard
(or DOT Crossing Number on nearest railroad/street crossing)

LATITUDE AND LONGITUDE *(degrees/minutes/seconds)* 39°06'55.07"N, 94°29'22.68"W

ADVISE THE NAME, ADDRESS, & CONTACT PERSON OF THE GOVERNMENTAL AGENCY REQUIRING THIS PROJECT:

Bruce Morrison, USEPA Region 7
11201 Renner Boulevard, Lenexa KS 66219
913-551-7751

Please describe your proposed project:

PROJECT LEVEL(S):

_____ PHASE I (Non-invasive & non-intrusive visual site inspection and records check only. No sampling will be involved.)

X PHASE II (Site investigation. You must advise specific testing to be performed from the list on the next page.)

_____ PHASE III (Site remediation.)

_____ OTHER (Please describe your project in detail only as it pertains to railroad property)

TERM: DATES

From: 12/1/13 To: 12/31/14 (Includes removal/lawful closure of facilities and/or monitoring wells)

TYPE OF ENVIRONMENTAL TESTING	NUMBER OF EACH
Subsurface Soil/Sediment Samples	48
Hand Held Auger Borings	
Soil Gas Survey Points	
Boring Drilled w/Soil Samples	12
Temporary Piezometer Wells	
Temporary Monitor Wells (must be flush-mounted)	
Permanent Monitoring Wells	
Recovery Wells & Associated above Ground Equipment	
Recovery Systems & Above Ground Equipment	
Other (Describe fully) Boring Direct Push W / discrete groundwater samples	3

SPECIAL PROVISIONS:

_____CONFIDENTIALITY (Required for all cases involving sale of Railroad property & in many other cases.)

_____RAILROAD FLAGMAN (Required in all Phase II/III cases & many other cases.)

_____MONITORING WELL (Required for all monitor wells & piezometers.)

_____FURNISH INFORMATION (Required in all cases.)

_____PROOF OF FINANCIAL CAPABILITY OR PERFORMANCE BOND (Required for all monitor wells, piezometers, & other facilities.)

CONTRACTOR INFORMATION:

*(Must be copied for **all contractors** that will work under this agreement)*

NAME OF CONTRACTOR Below Ground Surface, Inc

INCORPORATED IN WHAT STATE Kansas

FULL MAILING ADDRESS 8110 Cole Parkway, Shawnee, KS 66227

NAME & TITLE OF CONTRACTOR CONTACT PERSON Mike Ocsedy, President

CONTRACTOR TELEPHONE NUMBER 913-441-1088

CONTRACTOR FAX NUMBER 913-441-1086

EMAIL ADDRESS midwestbgs@sbcglobal.net

( ) COMPLETE AND RETURN THIS APPLICATION FORM, with
( ) A $555.00 CHECK *(Payable to Union Pacific Railroad Company)*, and
( ) THE OTHER REQUESTED MATERIAL ON THE CHECKLIST
to the appropriate Environmental Access Manager.

NOTE: Other fees and charges may be applicable to your request. These charges cannot be determined until your Project is approved.

Attachment 2
Contractor Information

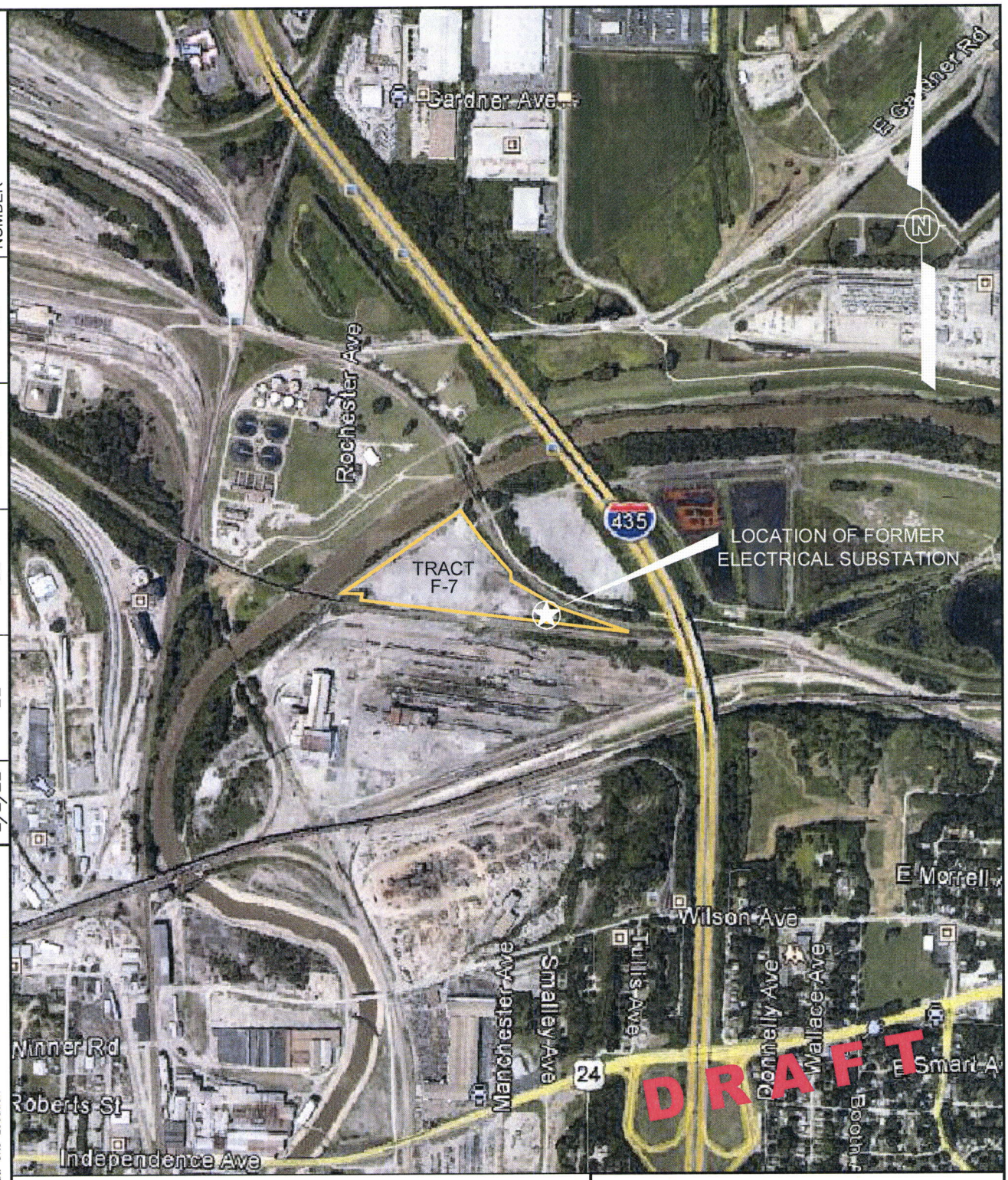
Contractor Information:

Prime Contractor:	CB&I
Project Manager:	Mark Finney, RG
Address:	11206 Thompson Avenue Lenexa, KS 66219
Phone No:	913.317.3591 Office 816.809.3256 Cell
Email:	mark.finney@CBI.com

Field Site Supervisor:	Shane Brungardt
Address:	11206 Thompson Avenue Lenexa, KS 66219
Phone No:	913.317.2632 Office 913.515.1032 Cell
Email:	shane.brungardt@CBI.com

Subcontractor:	BGS, Inc.
Owner:	Mike Ocsody, RG
Address:	8110 Cole Pkwy Shawnee, KS 66227
Phone No:	913-441-1088 Office
Email:	midwestbgs@sbcglobal.net

Attachment 3
Environmental Site Plan



DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE
501167070-A1	--	--	--	--	-/-/--

File: O:\Project\501167070\501167070-A1.dwg Layout: Site Location
User: greg.jones Nov 21, 2013 - 1:01pm

SCALE

0 1000 2000 FEET

REFERENCE:

GOOGLE EARTH

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

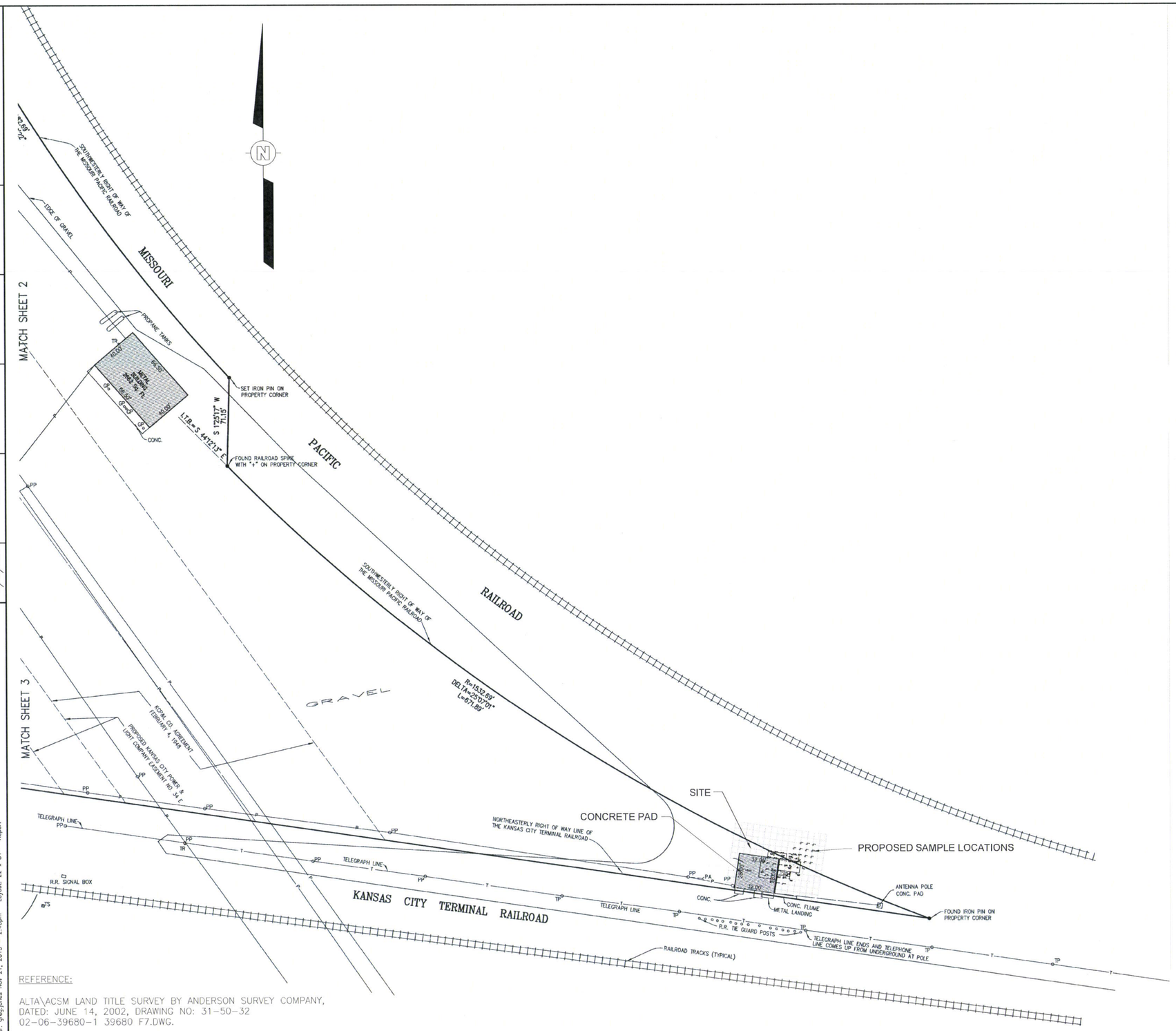
FIGURE 1

SITE LOCATION MAP

FORMER GST STEEL
KANSAS CITY, MISSOURI

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
--	--	--	--	501167070-D2

DATE: -/-/--



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REFERENCE:

ALTA\ACSM LAND TITLE SURVEY BY ANDERSON SURVEY COMPANY, DATED: JUNE 14, 2002, DRAWING NO: 31-50-32 02-06-39680-1 39680 F7.DWG.

File: G:\Project\501167070\501167070-02.dwg
User: greg.jones Nov 21, 2013 - 2:46pm Layout: 22 x 34 - Report

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 2
SITE PROPERTY BOUNDARY

FORMER GST STEEL
KANSAS CITY, MISSOURI

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE
501167070-B4	--	--	--	--	-/-/--

COMPOSITE 1		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	4.7 mg/Kg	5/21/13

CHIP 3		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1,100 mg/Kg	4/3/13

COMPOSITE 3		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1.7 mg/Kg	5/21/13

EXCAVATION 2-1		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	13 mg/Kg	6/18/13

EXCAVATION 2-2		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	3 mg/Kg	6/18/13

EXCAVATION 2-3		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1.9 mg/Kg	6/18/13

COMPOSITE 2		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	27 mg/Kg	5/21/13

COMPOSITE 4		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	3.5 mg/Kg	5/21/13

EXCAVATION 2-4		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1.7 mg/Kg	6/18/13

EXCAVATION 2-5		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	4.7 mg/Kg	6/18/13

CHIP 4		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	99 mg/Kg	4/3/13

CHIP 2		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	2.1 mg/Kg	3/13/13

CHIP 5		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	10 mg/Kg	4/3/13

CHIP 1		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	7.4 mg/Kg	3/13/13

CHIP 6		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	42 mg/Kg	4/3/13

CONCRETE PAD

APPROXIMATE LOCATION OF VAULT

APPROXIMATE VAULT MANHOLE LOCATION

CS-115 CS-111 CS-107 CS-114 CS-110 CS-106 CS-103 CS-113 CS-109 CS-105 CS-102 CS-112 CS-108 CS-104 CS-101 CS-118 CS-116 CS-117 CS-121 CS-119 CS-120 CS-122

202N2 202NE 202N 202 202E1 202E2 202S

CHIP 1 CHIP 2 CHIP 3 CHIP 4 CHIP 5 CHIP 6

COMPOSITE 1 COMPOSITE 2 COMPOSITE 3 COMPOSITE 4

15'-0" 12'-0" 5'-0" 3'-6" 5'-6" 17'-0" 28'-0" 10'-0" 9'-0" 4'-0" 15'-0" 33'-0"

LEGEND:

- PREVIOUS SAMPLE LOCATION
- PREVIOUS SAMPLE LOCATION
- COMPOSITE SAMPLE LOCATION
- NORTHEAST PAD AREA – EXCAVATION 1
- EAST AREA – EXCAVATION 2
- NORTH – EXCAVATION 3
- SOUTHEAST AREA – EXCAVATION 4
- CONCRETE CHIP SAMPLE LOCATION

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 3
CONCRETE PAD AND FILL MATERIAL SAMPLE RESULTS
FORMER GST STEEL
KANSAS CITY, MISSOURI

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User: gregjones Nov 21, 2013 - 2:12pm Layout: Layout1-11 x 17

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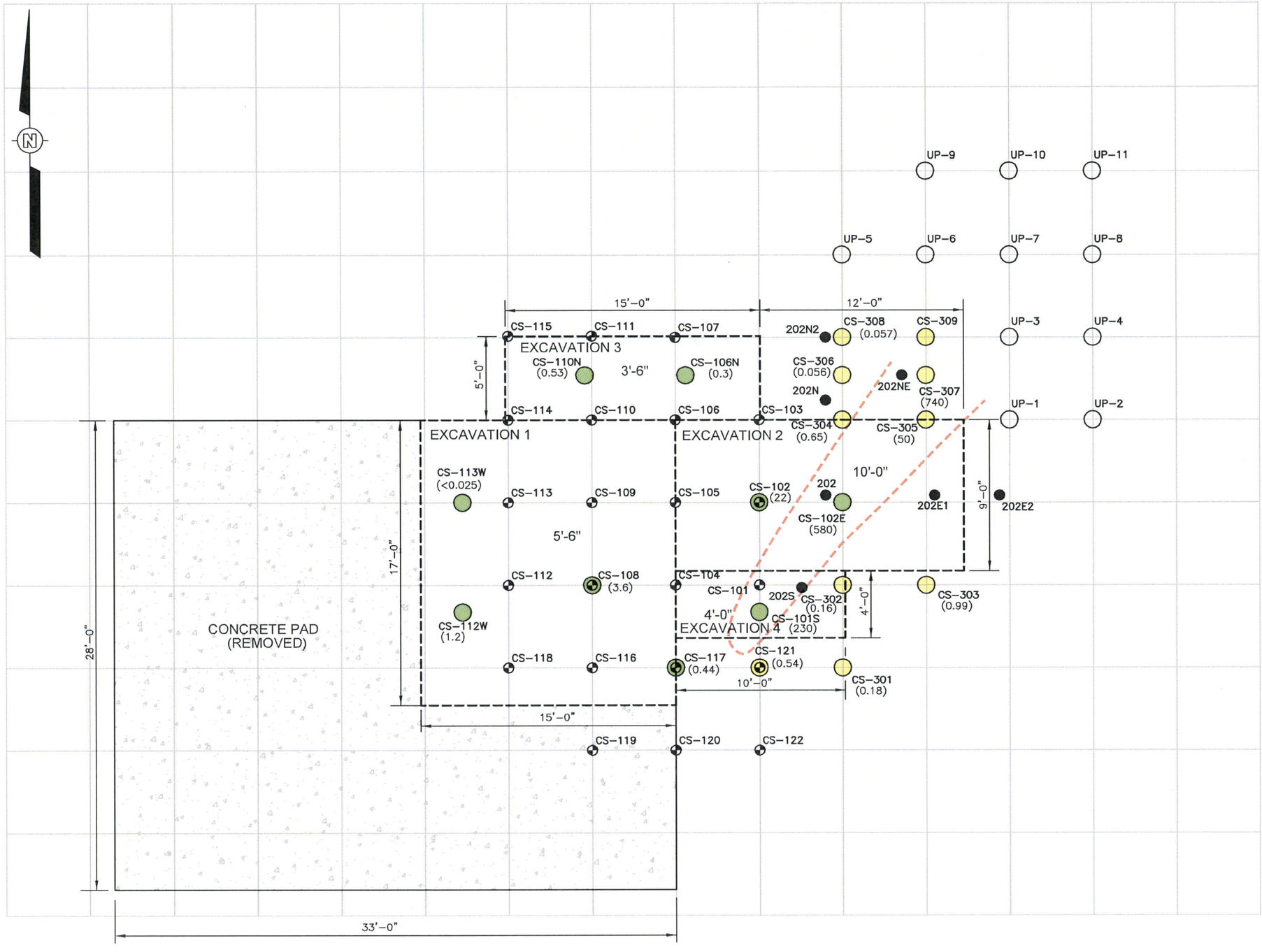

LEGEND:

- PREVIOUS SAMPLE LOCATION
- CONFORMATION SAMPLE, PCB CONCENTRATION IN mg/kg
- CHARACTERIZATION SAMPLE, PCB CONCENTRATION IN mg/kg
- PROPOSED OFF SITE CHARACTERIZATION SAMPLE
- PCB CONCENTRATION IN SOIL >25 mg/kg

REFERENCE:

REFERENCE ALL DRAWINGS FROM OTHER SOURCES HERE.

SCALE

0 6 12 FEET

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 4

PROPOSED OFF SITE SAMPLE LOCATIONS

FORMER GST STEEL
KANSAS CITY, MISSOURI

File: O:\Project\501167070\501167070-B7.dwg
User: greg.jones Nov 21, 2013 - 2:15pm Layout: Layout1-11 x 17

LEGEND:

- FORMER SUBSTATION
- EXCLUSION ZONE SECURITY FENCE
- DECONTAMINATION AREA
- TRACT F-7

N

0 25 50 100

Feet

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 5
SITE DETAILS MAP
FORMER GST STEEL
KANSAS CITY, MISSOURI

Attachment 4
Work Plan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

NOV 0 8 2013

Mr. Glen Schwartz
Mile Rail, LLC
8116 Wilson Road
Kansas City, Missouri 64125

RE: Approval of the PCB Characterization Work Plan Addendum Dated November 6, 2013 for the Former GST Steel Facility Site

Dear Mr. Schwartz:

The United States Environmental Protection Agency has reviewed the subject document and hereby approves of the document with no comment.

I can be reached at (913) 551-7755 if you have any questions concerning this matter.

Sincerely,

Bruce Morrison
Project Manager
Waste Remediation and Permitting Branch
Air and Waste Management Division

cc: Mark L. Finney, Shaw Environmental, Incorporated

Shaw Environmental, Inc. (a CB&I Company)
11206 Thompson Avenue
Lenexa, KS 66219
913-451-1224
Fax: 913-317-2660

November 6, 2013

Mr. Bruce Morrison.
Environmental Engineer
Air and Waste Management Division
U.S Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

RE: Addendum – PCB Characterization Work Plan
Former GST Steel Facility
Kansas City, Missouri

Mr. Morrison:

On behalf of the Mile Rail, LLC (Mile Rail), Shaw Environmental, Inc. (Shaw), a CB&I Company, is submitting the attached Addendum to the PCB Characterization Work Plan (Work plan) for additional investigation and remedial activities at the former GST Steel Facility located at 8116 Wilson Road, Kansas City, Missouri. It is presumed that polychlorinated biphenol (PCBs) have migrated through the vadose zone and have extended to the northeast onto the adjacent property. The Addendum to the Work Plan describes the process for continuing the characterization and remedial activities. A copy of the access request letter is included as an attachment to the Addendum to the Work Plan.

If you have any questions or require additional information, please contact me at 913-317-3591 at your earliest convenience.

Sincerely,

Mark L. Finney, RG
Project Manager

Cc:
Doug Curran, Stinson Morrison Hecker LLP

Addendum

This addendum to the EPA approved "PCB Characterization Work Plan" (Work Plan) dated February 2013, was prepared to address the possible migration of PCBs through the vadose zone onto the adjacent property to the northeast. Portions of the proposed field activities are dependent on obtaining access to the adjacent property.

Investigation Summary

All investigation and remedial activities were conducted under the EPA approved Work Plan and "Removal Action Plan" (RAP) dated July 2013. Per the client's requests, characterization and removal action activities were conducted in conjunction with an attempt to expedite the schedule. The results of the concrete pad and fill material sampling are summarized in the RAP and illustrated on Figure 1. A summary of the concrete pad and fill removal, vault sampling, and characterization sampling activities are provided below.

Concrete Pad and Fill Material Disposal

A removal action (RA) was conducted from July 31, 2013 through August 1, 2013 to remove portions of the identified PCB containing waste from the site agreed on by the EPA and Mile Rail. This included the former substation concrete pad, the majority of the soil located within the confines of the vault, and fill material previously placed in the excavations by others. Waste containing PCB concentrations below 50 mg/kg were disposed at the Johnson County Landfill. Materials containing PCB at or greater than 50 mg/kg were disposed at the Heritage Environmental Services, LLC hazardous waste facility located in Roachdale, Indiana. Below are the actual quantities of materials disposed off site at the approved land disposal facilities during the RA conducted on July 31 and August 1, 2013:

Heritage (haz waste):

- End Dump: 21.89 Tons
- Roll-off #1: 11.33 Tons
- Roll-off #2: 14.01 Tons

Johnson County Landfill – Deffenbaugh (special waste):
6 End dumps:

- End Dump: 7.19 tons
- End Dump: 14.47 tons
- End Dump: 25.40 tons
- End Dump: 14.56 tons
- End Dump: 17.61 tons
- End Dump: 13.10 tons

Vault Samples (concrete, sediment, and water)

Samples were collected from the side walls and contents of the vault to determine final disposition of the concrete vault. On August 8, 2013, the remaining sediment and water in the vault were sampled and submitted for PCB analysis using EAP Method 8082. The results of the analytical testing indicated that the sediment in the vault contained 1.3 mg/kg of PCB and the water contained 37.2 ug/L of PCBs. On October 1, 2013, attempts were made to remove the water from the vault to collect chip samples of the opposing side walls and floor of the vault. Ten, 55-gallon drums of water were pumped from the vault in an attempt to dewater the vault. The water level maintained approximately 8 to 10 inches deep through this process, preventing the collection of the chip sample from the vault floor. Chip samples were collected from the opposing north and south side walls from a level with observed staining. PCB concentrations in the sediment and chip samples were below the Low Occupancy Limit of 25 mg/kg. The results of the analytical testing are summarized in **Table 1**.

Characterization Samples
On August 20, 2013, continuous soil samples were collected from 14 locations as specified in the Work Plan. All sample activities were conducted in accordance with Section 2.0 of the Work Plan. The limits of PCBs in the soil were defined to 1 mg/kg on the Mile Rail property. It is believed that the PCBs in the soil may extend off site to the northeast onto the adjacent property. PCBs on Mile Rail property were detected in a narrow band from CS-101S (230 mg/kg) located in Excavation 4 extending to the northeast to CS-307 (740 mg/kg). The detection at CS-101S was located at approximately 6.6 feet below the pad reference and trended downward as it migrated to the northeast to 14 to 16 feet below the pad at CS-102E (580 mg/kg), and to 16 to 22 feet below the top of the pad near the north property line at CS-307 (740 mg/kg). The analytical testing results are summarized in **Table 1** and illustrated in **Figure 2**.

Proposed Field Activities
Additional investigation is required on the adjacent property to the northeast of the Excavation 2 to delineate the extent of PCBs in the vadose zone as illustrated in **Figure 2**. Groundwater samples are recommended from the shallow aquifer beneath the identified impacted area. Offsite access to the adjacent property is required to complete this task. Field activities associated with site characterization will be conducted in accordance with the Work Plan.

Soils indentified on the Mile Rail property with PCB concentrations exceeding the Low Occupancy Limit of 25 mg/kg will be excavated and transported to the appropriate approved landfill for disposal as outlined in the RAP.

PCB Characterization Soil
Characterization of the PCB impacted soil on the Mile Rail property was completed on August 20, 2013. PCB concentration in the soil exceeding the Low Occupancy Limit of 25 mg/kg were identified east of the pad extending to the northeast through Excavations 4 and 2 to the limits of the investigation, presumably offsite. Additional investigation work is required on the adjacent property to the northeast to delineate the vertical and horizontal extent of PCBs in the vadose zone.

Once access to the adjacent property has been obtained, soil samples will be collected following the same protocol outlined in Section 2.1.4 of the Work Plan to delineate the PCB concentrations in the soil to 1 mg/kg. The established 1.5 meter grid will be extended to the north and east of Excavation 2 to provide a continuous sample grid for continuity between sampling events. The proposed sample intervals will coincide with the interval of the adjacent boring where elevated levels of PCBs were detected. Due to the uneven terrain, all sample intervals are referenced from the top of the concrete pad. The proposed soil sample locations and intervals are summarized in **Table 2** and illustrated in **Figure 2**.

Groundwater
Discrete groundwater samples are recommended at previous soil samples points located along the axis of the elevated PCB concentration in the soil to evaluate the potential impact on the underlying groundwater. Samples will be collected adjacent to CS-102E and CS-307. Discrete groundwater samples will be collected by advancing a standard discrete groundwater sampler such as a SP22 or equivalent to the target depth and retracting the rod housing to expose the screen. Fluid in the probe rod and sampler will be purged to remove as much sediment as practical. A filtered and non-filtered groundwater sample will be collected from each location and submitted for PCB analysis. The proposed discrete groundwater sample locations are illustrated in **Figure 2**.

Removal Action
It is recommended at this time to proceed with the removal action as outlined in the RAP with respect to impacted soils on the Mile Rail property. All field activities associated with the proposed removal action will be conducted in accordance with the RAP. The remedial action for the potentially impacted soil on

the adjacent property will be determined following completion of the PCB characterization and approval from the property owner and the EPA. This task is pending approval for access to the adjacent property.

Soil with PCB concentrations less than 25 mg/kg will be left on site. Impacted soil with PCB concentrations exceeding 25 mg/kg on Mile Rail property will be excavated and disposed at an EPA approved landfill as outlined in Section 4.1.5 of the RAP. Non-hazardous soil with PCB concentrations greater than 25 mg/kg but less than 50 mg/kg will be disposed at the Johnson County Landfill. Soils classified as hazardous, PCB concentrations greater than 50 mg/kg, will be disposed as TSCA waste at the Heritage Environmental Services, LLC facility located in Roachdale, Indiana. Overburden soils with PCB concentrations less than 25 mg/kg will be temporarily stockpiled on the adjacent portions of Excavation 2 while the underlying impacted soil is removed. Portions of the excavated soil may be used to fill the former vault. The stockpiled soil will be returned to the original excavation following confirmation sampling and analytical results indicating all impacted soil above 25 mg/kg of PCBs has been removed.

Table 1
Sample Analytical Summary
Former GST Steel Facility
Kansas City, Missouri

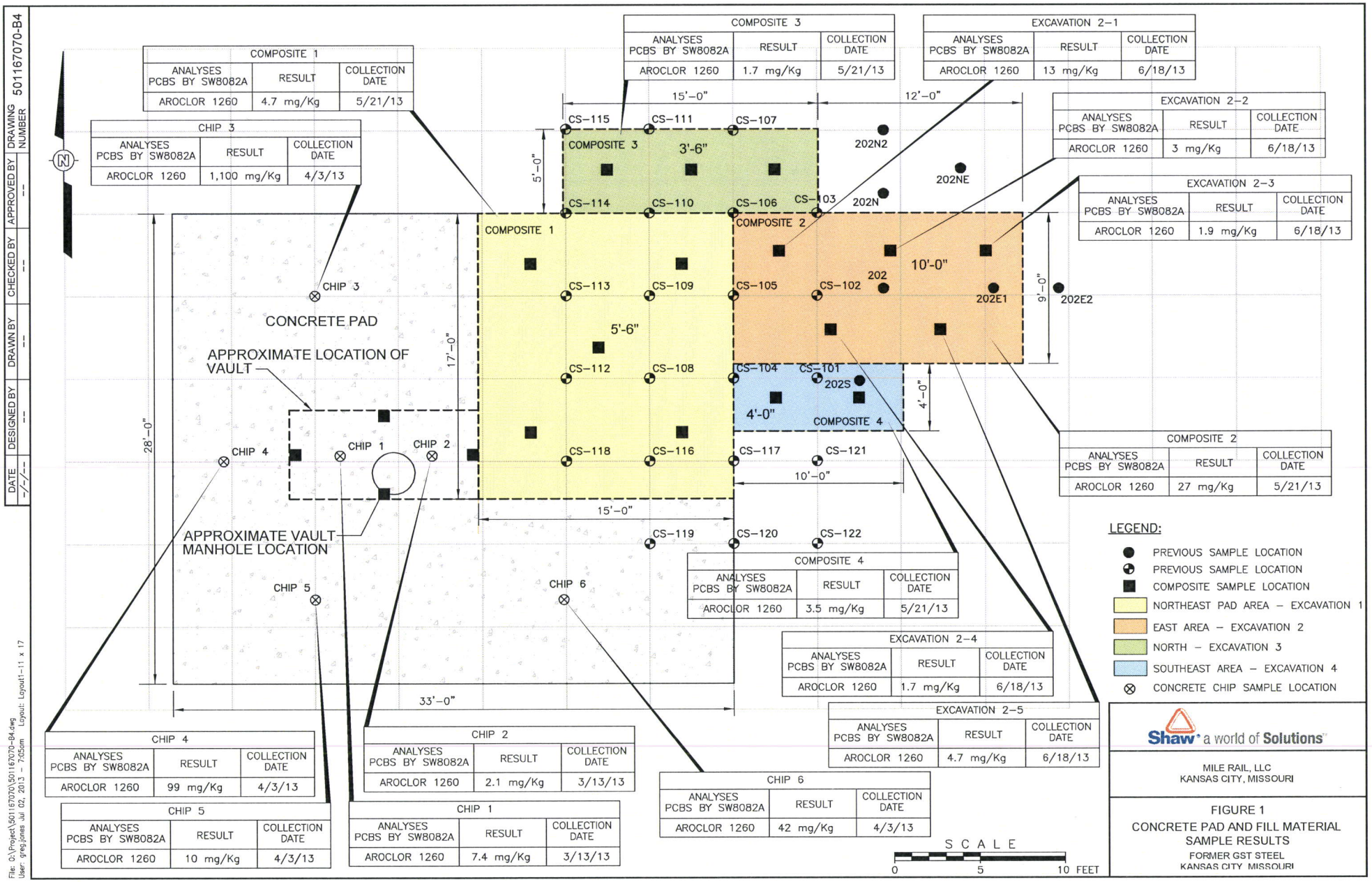
Sample ID	Date Sampled	Excavation	Excavation Depth (ft)	Ground Surface (ft)	Sample Interval (ft)	PCB (mg/kg)
Vault Samples						
Vault Fill	08/01/13	Vault	NA	NA	0-1	1.3
Vault Water	08/01/13	Vault	NA	NA	0-1	0.0372
Vault Chip North	10/01/13	Vault	NA	NA	Surface	2.1
Vault Chipe South	10/01/13	Vault	NA	NA	Surface	2
Confirmation Samples						
CS-113W	08/01/13	Exacavation 1	5.5	ND	0-1	<0.025
CS-112W	08/01/13	Exacavation 1	5.5	ND	0-1	1.2
CS-108	08/01/13	Exacavation 1	5.5	ND	0-1	3.6
CS-117	08/01/13	Exacavation 1	5.5	ND	0-1	0.44
CS-101S	08/01/13	Exacavation 4	4	6.6	0-1	230
CS-102	08/01/13	Exacavation 2	10	6.93	0-1	22
CS-102E	08/01/13	Exacavation 2	10	7.07	0-1	0.25
CS-110N	08/01/13	Exacavation 3	3.5	ND	0-1	0.53
CS-105N	08/01/13	Exacavation 3	3.5	ND	0-1	0.3
Characterization Samples						
CS-301	08/20/13	Southeast	4	4.51	6-8	0.11
					8-10	0.18
					10-12	NT
					14-16	NT
CS-302	08/20/13	Exacavation 4	4	4.7	6-8	0.16
					8-10	0.4
					10-12	NT
					14-16	0.15
CS-303	08/20/13	Southeast	10	5.07	12-14	NT
					14-16	0.99
					16-18	NT
					18-20	NT
CS-304	08/20/13	Exacavation 2	10	6.75	12-14	0.17
					16-18	0.65
					20-22	0.25
					24-26	NT
					28-30	NT
CS-305	08/20/13	Exacavation 2	10	6.87	12-14	50
					16-18	3.6
					20-22	0.014
					24-26	NT
					28-30	NT
CS-306	08/20/13	Northeast	10	4.19	12-14	NT
					16-18	0.056
					20-22	NT
					24-26	NT
					28-30	NT
CS-307	08/20/13	Northeast	10	4.39	12-14	0.18
					16-18	260
					20-22	740
					24-26	0.04
					28-30	15
CS-308	08/20/13	Northeast	10	3.49	12-14	NT
					16-18	0.057
					20-22	0.015
					24-26	NT
					28-30	NT
CS-309	08/20/13	Northeast	10	---	12-14	NT
					16-18	NT
					20-22	NT
					24-26	NT
					28-30	NT
CS-102	08/20/13	Exacavation 2	10	6.93	10-12	2.4
					14-16	0.29
					17-19	NT
CS-102E (202)	08/20/13	Exacavation 2	10	7.07	10-12	0.15
					14-16	580
					17-19	0.013
CS-101S	08/20/13	Exacavation 4	4	6.6	4-6	8.4
					6-8	NT
					10-12	0.55
CS-117	08/20/13	Southeast	5.5	6.21	6-8	NT
					8-10	0.032
					10-12	NT
CS-121	08/20/13	Southeast	3.64	3.64	4-6	0.54
					6-8	NT
					8-10	NT
					10-12	NT

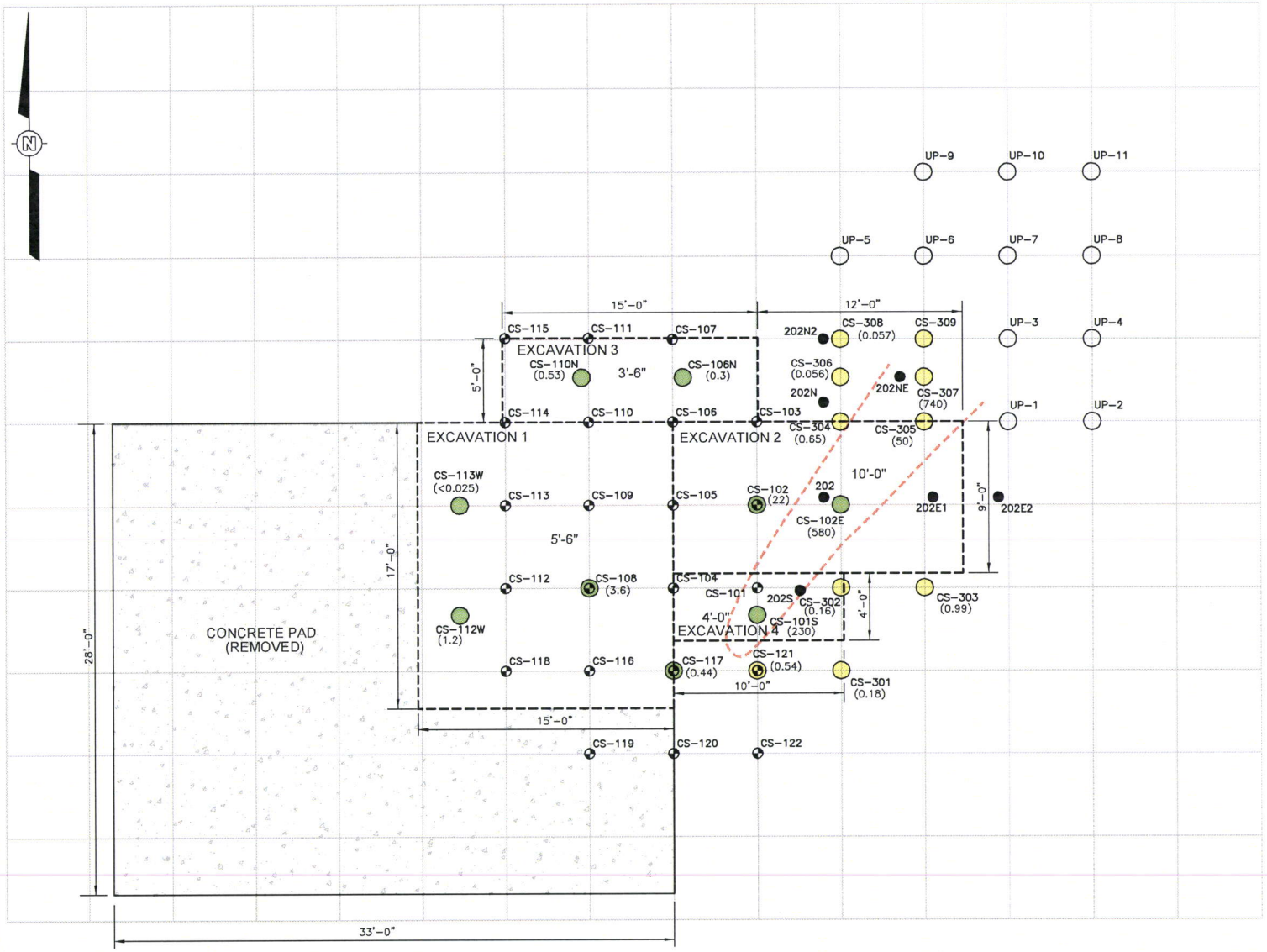
Note:
NT - Not Tested
ND - Not Determined
Sample depths referenced from top of pad in feet.
Exceeded 25 mg/kg of PCBs

Table 2
Proposed Sampling Intervals
Former GST Steel Facility
Kansas City, Missouri

Sample ID	Excavation	Ground Surface (ft)	Media	Sample Interval (ft)				
Characterization Samples								
CS-309	Northeast	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-1	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-2	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-3	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-4	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-5	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-6	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-7	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-8	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-9	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-10	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
UP-11	Adjacent Property	TBD	Soil	---	12-14	16-18	20-22	24-26
			Soil					
Characterization Samples								
CS-102E	Excavation 2	7.07	Groundwater	---	---	---	---	24-26
CS-307	Northeast	4.39	Groundwater	---	---	---	---	24-26

Samples to be analyzed first.


DRAWING NUMBER 501167070-B4
APPROVED BY --
CHECKED BY --
DRAWN BY --
DESIGNED BY --
DATE -/-/--
COMPOSITE 1
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 4.7 mg/Kg | 5/21/13
COMPOSITE 3
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 1.7 mg/Kg | 5/21/13
EXCAVATION 2-1
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 13 mg/Kg | 6/18/13
EXCAVATION 2-2
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 3 mg/Kg | 6/18/13
EXCAVATION 2-3
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 1.9 mg/Kg | 6/18/13
CHIP 3
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 1,100 mg/Kg | 4/3/13
COMPOSITE 2
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 27 mg/Kg | 5/21/13
COMPOSITE 4
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 3.5 mg/Kg | 5/21/13
EXCAVATION 2-4
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 1.7 mg/Kg | 6/18/13
EXCAVATION 2-5
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 4.7 mg/Kg | 6/18/13
CHIP 4
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 99 mg/Kg | 4/3/13
CHIP 2
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 2.1 mg/Kg | 3/13/13
CHIP 6
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 42 mg/Kg | 4/3/13
CHIP 5
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 10 mg/Kg | 4/3/13
CHIP 1
ANALYSES PCBS BY SW8082A | RESULT | COLLECTION DATE
AROCLOR 1260 | 7.4 mg/Kg | 3/13/13
CS-115
CS-111
CS-107
CS-114
CS-110
CS-106
CS-103
CS-113
CS-109
CS-105
CS-102
CS-112
CS-108
CS-104
CS-101
CS-118
CS-116
CS-117
CS-121
CS-119
CS-120
CS-122
202N2
202NE
202N
202
202S
202E1
202E2
COMPOSITE 1
COMPOSITE 2
COMPOSITE 3
COMPOSITE 4
3'-6"
5'-6"
10'-0"
4'-0"
15'-0"
12'-0"
5'-0"
17'-0"
28'-0"
9'-0"
4'-0"
10'-0"
15'-0"
33'-0"
CONCRETE PAD
APPROXIMATE LOCATION OF VAULT
APPROXIMATE VAULT MANHOLE LOCATION
CHIP 1
CHIP 2
CHIP 3
CHIP 4
CHIP 5
CHIP 6
LEGEND:
PREVIOUS SAMPLE LOCATION
PREVIOUS SAMPLE LOCATION
COMPOSITE SAMPLE LOCATION
NORTHEAST PAD AREA - EXCAVATION 1
EAST AREA - EXCAVATION 2
NORTH - EXCAVATION 3
SOUTHEAST AREA - EXCAVATION 4
CONCRETE CHIP SAMPLE LOCATION
SCALE
0
5
10 FEET
Shaw a world of Solutions
MILE RAIL, LLC
KANSAS CITY, MISSOURI
FIGURE 1
CONCRETE PAD AND FILL MATERIAL SAMPLE RESULTS
FORMER GST STEEL
KANSAS CITY, MISSOURI
File: O:\Project\501167070\501167070-B4.dwg
User: greg.jones Jul 02, 2013 - 7:05am Layout: Layout1-11 x 17



REFERENCE:

REFERENCE ALL DRAWINGS FROM OTHER SOURCES HERE.

DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
-/-/--	--	--	--	--	501167070-B7

File: G:\Project\501167070\501167070-B7.dwg
User: greg.jones Nov 05, 2013 - 2:47pm Layout: Layout1-11 x 17

Shaw a world of Solutions

MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 2

MAXIMUM PCB CONCENTRATIONS IN SOIL

FORMER GST STEEL
KANSAS CITY, MISSOURI

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

FEB 2 0 2013

Mr. Glen Schwartz
Mile Rail, LLC
8116 Wilson Road
Kansas City, Missouri 64125

RE: Approval of the PCB Characterization Work Plan Addendum Dated February 12, 2013 for the Former GST Steel Facility Site

Dear Mr. Schwartz:

The United States Environmental Protection Agency has reviewed the subject document and hereby approves of the document with no further comment.

I can be reached at (913) 551-7755 if you have any questions concerning this matter.

Sincerely,

Bruce A. Morrison

Bruce Morrison
Project Manager
Waste Remediation and Permitting Branch
Air and Waste Management Division

cc: Mark L. Finney, Shaw Environmental, Incorporated

PCB Characterization Work Plan

Former GST Steel Facility Site
Kansas City, Missouri

Project: 148313

February 12, 2013

Prepared for:

Mile Rail, LLC
8116 Wilson Road
Kansas City, Missouri 64125

Prepared by:

Shaw® Shaw Environmental, Inc.

Shaw Environmental, Inc.
11206 Thompson Avenue
Lenexa, Kansas 66219

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1.0 INTRODUCTION

The *PCB Characterization Work Plan* (Work Plan) was prepared by Shaw Environmental, Inc. (Shaw) as an addendum to the "Notification & Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste" dated March 31, 2012 to document the proposed polychlorinated biphenol (PCB) characterization sampling activities. A series of remedial action (RA) activities were conducted by Compass Big Blue, LLC (Compass) and documented by West Central Environmental Consultants, Inc. (WCEC). The majority of the known PCB impacted soil has been removed from the site and disposed at an approved offsite landfill. The excavations and a concrete vault were filled with onsite soil. PCB impacted soil above 25 parts per million (ppm) remain onsite east of the former substation pad, extending to the northeast. The EPA had expressed concerns that the requirements of 40 CFR 761.61 and Subpart O have not yet been satisfied for the site.

On November 26, 2012, the Environmental Protection Agency Region 7 (EPA) requested testing of the fill material placed in the previous excavation, testing of the concrete vault located beneath the substation pad, and characterization of the PCBs in the soil to 1 ppm prior to conducting any further RA activities. This Addendum was prepared to fulfill the requirements of 40 CFR 761.61 and Subpart O and the requests of the EPA. Field activities proposed in this Addendum will be conducted in accordance with the approved Work Plan, 40 CFR 761.61 and Subpart O, and the provided Shaw standard operating procedures (SOPs).

1.1 Objective

The objective of this work plan is to present the conceptual approach and outline procedures for field personnel to follow during the PCB characterization activities. The proposed investigation will be conducted to 1) confirm PCB concentrations in the vault cover, 2) confirm PCB concentrations in the material used to fill the previous excavations and vault, 3) confirm PCB concentrations in the floor of the previous excavations, 4) characterize the extent of PCB concentrations in the native soil to 1 ppm, and 5) confirm PCB concentrations in exposed concrete adjacent to impacted soil, where exposed. This information will be used to assess remaining PCB concentrations at the site and evaluate remedial options. The following tasks will be performed to meet the objectives:

- Collect two chip samples from the concrete surface of the vault to determine PCB concentrations. If PCB concentrations exceed 1 ppm, additional samples will be collected from the surface of the pad outside of the vault cover to characterize the extent of surface contamination.
- Remove the concrete slab over the vault to provide access to the vault. Disposal will be based on the results of the surface concrete chip samples.
- Collect a composite sample of the fill material located within the vault to determine PCB concentrations.
- Collect four composite samples from the fill material placed in previous excavations to determine PCB concentrations.
- Collect composite samples of the bottom and side walls of the concrete vault to evaluate PCB concentrations. This task requires the removal of fill material from the vault after testing to determine handling and potential disposal options.

- Collect confirmation samples of the native soil located at the base of the previous excavation.
- Collect discrete soil samples along the northeast, east, and southeast limits of the previous excavations to characterize the limits of 1 ppm PCBs. Additional sample collected, if required for characterization, will be conducted on a 1.5 meter sample grid.
- Concrete, soil, and fill material samples will be submitted to an EPA certified laboratory for PCBs analysis.
- Prepare a brief report to summarize the findings and recommend a remedial option. The report will include the cumulative data from the previous sampling events, where available.

2.0 SITE SAMPLING PROCEDURES

This section presents a description of the field sampling activities and protocols to be implemented during the sampling program. The activities discussed in this section include fill material sampling, confirmation sampling, vault sampling, and characterization sampling. The locations of the proposed samples to be collected are illustrated in **Figures 1** and **2**. Sample collection depths are referenced from the top of the former substation pad as referred to as below ground surface (bgs) in this document.

All field activities will be conducted in accordance with the Shaw SOPs provided in **Appendix A**. All field activities and sampling procedures will be documented in a field logbook as outlined in SOP EI-FS001 Field Logbook. Equipment decontamination will be conducted in accordance with procedures outlined in SOP EI-FS014 Decontamination of Contact Sampling Equipment.

2.1 Field Activities

Field activities will be conducted in three phases. Phase 1 will be to characterize PCB concentrations in the concrete vault cover. Phase 2 remove the vault cover and verify the PCB concentrations in the fill material. Phase 3 characterize the extent of PCBs in the soil and concrete to 1 ppm.

Phase 1, chip samples will be collected at two locations on the surface of the vault cover to evaluate PBC concentrations in the concrete. If PCBs are detected in the concrete, additional chip samples will be collected on 1 .5 meter grid to characterize the extent of the PCBs in the surface concrete. The vault cover will not be removed until the concrete cover is characterized.

Phase 2, the fill material will be analyzed to verify the PCB concentrations. The vault cover will be removed to provide access for sample collection. Debris from the vault cover will be managed based on Phase 1 analytical data. Composite soil samples will be collected from the four identified areas as illustrated in **Figure 1**. This information will be used to determine how to manage the fill material and approach the Phase 3 characterization. This activity will result in disturbance to the pad and minimal disturbance to the site.

Phase 3, discrete soil samples will be collected from the former excavations, adjacent soil, and exposed concrete structures to characterize PCB's to 1 ppm. Borings will be advanced through the fill material, where necessary, to characterize PCBs in the underlying soils. Fill material will be removed from the vault to access the vault. Samples will be collected from the vault to characterize potential residual PCBs in the concrete. Fill material removed from the vault and debris from the vault cover will be managed accordingly based on Phase 1 and 2 test results.

2.1.1 Fill Material Samples

A series of removal actions were conducted at the site to remediate PCB impacted soil at concentrations exceeding 1 ppm. Fill material consisting of onsite soil was used to fill in the excavation pits following the last removal action. The fill material was reportedly placed over four layers of heavy plastic sheeting (thickness not specified) to prevent potential cross-contamination of the fill material by the underlying soil. No analytical data was provided to document the PCB concentrations in the fill material.

Four excavations were identified based on the relative location to the concrete pad and excavation depth. The excavation in the northeast portion of the concrete pad was approximately 17 feet long by 15 feet wide and averaged 5.5 feet deep (northeast pad excavation). The adjacent excavation to the east was approximately 9 feet long by 17 feet wide and averaged 10 feet deep (east excavation). The excavation to the north was approximately 5 feet long by 15 feet wide and averaged 3.5 feet deep (north excavation). The excavation to the southeast was approximately 4 feet long by 10 feet wide and averaged 4 feet deep (southeast excavation).

In Phase 2, four composite samples will be collected from the fill material located within the limits of the excavations. Once the vault cover has been removed, one composite sample will be collected from the fill material located in the vault. Each composite sample will consist of ten aliquots. The aliquots will be collected at five locations within the limits of the designated excavation, two intervals per location. The sample intervals will be based on the thickness of fill material placed in each excavation to provide sample aliquots representative of the fill material. The lower sample interval will terminate a minimum of 1 foot above the perceived bottom of the excavation to reduce the risk of puncturing the plastic sheet placed at the bottom of the excavations, potentially cross contaminating the fill material. Aliquots will be collected from three and two boring locations in the north and southeast excavations, respectively, due to the relatively small quantity of fill material within these excavations. The sample intervals for each excavation are as follows:

- Northeast Pad Excavation: five locations, 1 to 2 feet and 3.5 to 4.5 feet bgs
- East Excavation: five location, 1 to 2 feet and 7 to 8 feet bgs
- North Excavation: three locations, 0 to 1 feet and 1.5 to 2.5 feet bgs
- Southeast Excavation: two locations, 0 to 1 feet and 1.5 to 2.5 feet bgs
- Vault: four locations, 1 to 2 feet and 3 to 4 feet bgs

Composite sample will be collected at locations illustrated in **Figure 1**. Fill material samples will be collected following procedures outlined in SOP EI-FS100 (Hand Auger Sampling) provided in **Appendix A**. Sampling activities will be documented in the field logbook and appropriate forms. This will include documentation of the location, sample ID, sample date and time, site conditions, and sample procedures.

2.1.2 Confirmation Samples

Data gaps were identified in the number and location of confirmation samples following the previous RAs. In Phase 2, discrete soil samples will be collected at the bottom of the previous excavation to confirm the PCB concentrations of the soil left in place. It is our understanding that plastic sheeting was placed over the excavation prior to placement of fill material to provide a protective barrier between the underlying soil and fill material. A dual tube sampler (DT Sampler) will be used during sample collected to minimize the potential for cross contamination. The number and location of the proposed discrete soil samples for confirmation purposes are illustrated in **Figure 2**.

A DT sampler with 3.25-inch rods or equivalent will be advanced to approximately 1 foot from the base of the fill material in the respective excavation. A soil sampler will be advanced through the DT rods to collect continuous soil samples from the base of the fill material to the terminal target depth. The sampler will be equipped with a clear PVC liner providing a 1.85-inch diameter soil core. This sample procedure will provide physical separation between the fill material and the soil sampler while providing adequate sample volume throughout the target interval for analytical testing.

Two soil samples will be collected at each proposed confirmation sample location illustrated in **Figure 2**. One sample will be collected from the 2-foot interval directly below the bottom of the excavation. The second sample will be collected from the interval 4 to 6 feet below the bottom of the excavation. The actual sample interval as referenced from the ground surface will vary with the respective excavation. Each sample collected from the target 2-foot sample interval designated for laboratory testing will be placed in a new 1-gallon ziplock bag and homogenized following SOP EI-FS010 (Sample Homogenization).

2.1.3 Vault Samples

A vault is located near the center of the former substation pad with an access hole approximately 30-inches in diameter. A water sample collected on September 27, 2012 from the vault contained 30.8 ug/L PCBs. Fluid from the vault was removed and the vault was subsequently filled with soil obtain from the site. Confirmation samples are required from the fill material located in the vault and bottom and side walls of the vault itself. This will require the demolition of the concrete pad over the vault to access the fill material.

In Phase 1, chip samples will be collected at two locations on the vault cover. The chips samples will be collected following procedures outlined in SOP EI-FS122 (Chip Sampling). An electric hammer drill is proposed for the collection of the chip samples. If PCB concentrations in the chip samples exceed 1 ppm, additional chip samples will be collected from the concrete pad on the established 1.5 meter grid to characterize the extent of PCBs in the concrete surface. The vault cover will not be removed during this phase pending analytical results.

In Phase 2, the portion of the concrete pad located over the vault will be removed to provide access to the vault. Debris generated during this activity will be managed based on the Phase 1 analytical results. If PCB concentrations exceed 1 ppm, the debris will be placed in a roll off box lined with 6 mil plastic sheeting pending offsite disposal.

One composite sample will be collected from the fill material located within the vault and tested for PCBs. The composite sample will contain eight aliquots collected from four boring locations, two sample intervals per boring as described in Section 2.1.1 of this document. The samples will be collected adjacent to each on the vault walls.

In Phase 3, the fill material will be removed from the vault and managed accordingly based on the PCB concentrations detected during laboratory testing. Concrete chip samples will be collected from the bottom and below the water line on opposing side walls of the vault once the fill material has been removed. The chips samples will be collected following procedures outlined in SOP EI-FS122 (Chip Sampling). An electric hammer drill is proposed for the collection of the chip samples.

2.1.4 Characterization Samples

Additional characterization is required to delineate PCB concentrations in the soil to 1 ppm. Additional sampling is required on the northeast and southeast extents of the previous removal action excavations. The most recent known data was collected on November 5, 2012. This data indicated that PCB concentrations in excess of 25 ppm remain in the soil below the limit of excavation and extends to the northeast of the East Excavation and greater than 1 ppm below the limit of excavation in the Southeast Excavation.

Continuous soil samples will be collected on a 1.5 meter grid around the perimeter of the East Excavation using a 4-foot macro sampler or equivalent equipped with a disposable

PVC sleeve. Discrete soil samples for laboratory analysis will be collect from the continuous core samples at roughly 4 foot intervals extending from 2 feet bgs to a depth below the perceived contamination. The terminal sample depth varies between locations based on historic data. Samples collected from intervals with perceived contamination outside of the limits of excavation will be analyzed first. The laboratory will be directed to hold the remaining samples pending the analytical results from the initial samples. If PCB concentrations are detected above 1 ppm, a subsequent sample will be analyzed. The proposed sample locations are illustrated in **Figure 2**. The number and individual sample intervals are summarized in **Table 1**. Characterization samples will be collected following procedures outlined in SOP EI-GS021 (Direct Push Drilling and Sampling) provided in **Appendix A**.

Additional samples collection may be required to characterize PCB concentrations to less than 1 ppm in the soil. If required, additional sample collection will follow the established 1.5 meter grid.

2.2 Decontamination

All equipment that has the potential to come into contact with the sample media will be decontaminated prior to and following use. This includes, but is not limited to, hand auger, discrete samplers (Geoprobe®), mixing bowls, etc. In general, decontamination will follow procedures outlined in SOP EI-FS014 (Decontamination of Sampling Equipment).

Decontamination of dual tube and macro samplers, sample rods, hand auger, and small sampling equipment will be conducted using new 5-gallon buckets or equivalent to contain decontamination fluids. Equipment will be cleaned using an Alconox/water solution, then rinsed with deionized (DI) water prior to and following use.

Demolition equipment, which may include a mini excavator and skid loader with breaker will be decontaminated by the contractor. All sampling equipment that comes in contact with potentially impacted soil will require decontamination prior to and following use. The equipment will be placed on plastic sheets and all visible soil and debris removed by dry-scrapping the parts that came in contact with the soil. This process will be followed by hand cleaning using an Alconox/water solution, then rinsing with deionized (DI) water. Decontamination fluids will be contained by the contractor and transferred into 55-gallon drums for testing and disposal. Plastic sheets and other non-liquid IDW will be placed in a 55-gallon drum labeled IDW for disposal. The location of the decontamination area is illustrated in Figure 3.

Decontamination fluids will be changed frequently based on visual observation. Waste decontamination fluids will be placed in an appropriately labeled 55-gallon drum for temporary storage. A sample will be collected from the waste decontamination fluid and analyzed for PCBs using EPA SW-846 Method 8082 to determine disposal options.

2.3 Analytical Program

Analytical requirements for the fill material, concrete chip, and characterization samples were determined to evaluate remedial options. Per the acknowledgement of the EPA Region 7, subsurface concrete structures will be managed as soil for remedial purposes. Historic analytical data is provided in **Appendix C**.

Soil and concrete chip samples will be submitted to the laboratory for PCB analyses following EPA SW-846 Method 8082 on a standard turnaround time. Aroclor 1260 was the

only PCB historically detected at the site. This method has a method detection limit of 1.8 ug/Kg for Aroclor 1260. Sample collection and handling will be conducted under standard chain-of-custody. The samples will be delivered to the laboratory by a Shaw representative or picked up by a representative from the laboratory.

Sample documentation, chain of custody, and shipping and packing procedures are outlined in SOP EI-FS006 Sample Label, SOP EI-FS003 Chain of Custody Documentation, and SOP EI-FS012 Shipping and Packing of Non-Hazardous Samples, respectively.

2.4 Exclusion Zone

The site is located in the east extent of Tract F-7 of the former GST Steel facility. The site is bordered by railroad tracks on the north, east, and south site with heavy vegetation along the tracks which restricts access to the site.

An exclusion zone will be established on the west boundary of the site to restrict access to the site from the west. The security fence will be construction approximately 20 feet west of the concrete pad in a north-south orientation extending to the established vegetation (brush). The fence will be constructed on metal T-posts driven into the ground with 4-foot high orange safety fence attached. Vehicle traffic within the limits of the exclusion zone will be limited to site construction equipment. The approximate location of the security fence denoting the exclusion zone is illustrated in Figure 3.

Analytical data from previous investigations indicate that the surface PCB impacted soil has been removed. Intrusive activities proposed during this phase of the RA are limited to soil borings and vault sampling. Soil cuttings and fill materials located in the vault will be tested and managed accordingly to prevent the transfer of impacted materials outside of the exclusion zone.

3.0 SITE REMEDIAL IMPLEMENTATION PLAN

The results of the sampling activities will be summarized in a brief letter report. The report will include a summary of the sampling activities, description of the site conditions, results of the chemical laboratory analyses, and proposed RA. Drawings will be prepared to illustrate the sample locations and proposed RA. The laboratory analytical data will be summarized in a table. The field notes, sample collection logs, chain-of-custody, and laboratory report will be provided as appendices.

Tables

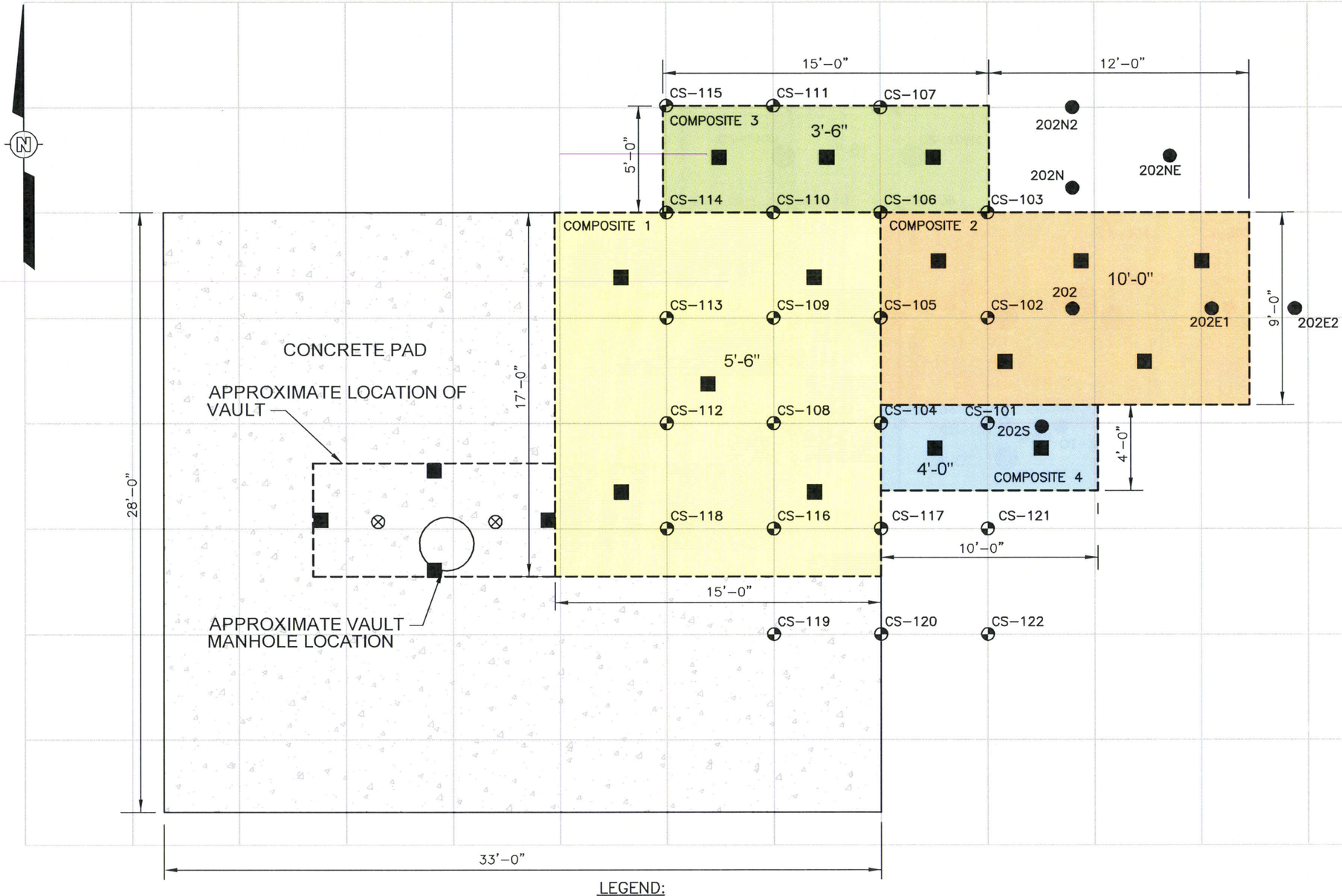
Table 1
Proposal Sampling Intervals
Former GST Steel Facility
Kansas City, Missouri

Sample ID	Excavation	Excavation Depth (ft)	Ground Surface (ft)	Sample Interval (ft)				
Confirmation samples								
CS-108	Northeast Pad	5.5		6-8	8-10	10-12	---	---
CS-112W	Northeast Pad	5.5		6-8	8-10	10-12	---	---
CS-113W	Northeast Pad	5.5		6-8	8-10	10-12	---	---
CS-117	Northeast Pad	5.5		6-8	8-10	10-12	---	---
CS-110N	North	3.5		4-6	8-10	---	---	---
CS-106N	North	3.5		4-6	8-10	---	---	---
CS-102	East	10		10-12	14-16	17-19	---	---
202	East	10		10-12	14-16	17-19	---	---
CS-101S	Southeast	4		4-6	6-8	10-12	---	---
Characterization Samples								
CS-301	Southeast	4		2-4	4-6	6-8	10-12	---
CS-302	Southeast	4		2-4	4-6	6-8	10-12	---
CS-303	East	10		2-4	4-6	6-8	10-12	---
CS-304	East	10		2-4	6-8	10-12	14-16	18-20
CS-305	East	10		2-4	6-8	10-12	14-16	18-20
CS-306	East	10		2-4	6-8	10-12	14-16	18-20
CS-307	East	10		2-4	6-8	10-12	14-16	18-20
CS-308	East	10		2-4	6-8	10-12	14-16	18-20
CS-309	East	10		2-4	6-8	10-12	14-16	18-20
CS-102	East	10		10-12	14-16	17-19	---	---
202	East	10		10-12	14-16	17-19	---	---
CS-101S	Southeast	4		4-6	6-8	10-12	---	---
CS-117	Northeast Pad	5.5		6-8	8-10	10-12	---	---
Characterization Samples - Corrected Sample Depths								
Sample ID	**Excavation**	**Excavation Depth (ft)**	**Ground Surface (ft)**	**Sample Interval (ft)**				
CS-301	Southeast	4		6-8	8-10	10-12	14-16	--- Pad
CS-301	Southeast		4.51	2-4	4-6	6-8	10-12	--- BGS
CS-302	Southeast	4		6-8	8-10	10-12	14-16	--- Pad
CS-302	Southeast		4.7	2-4	4-6	6-8	10-12	--- BGS
CS-303	East	10		12-14	14-16	16-18	18-20	--- Pad
CS-303	East		5.07	7-9	9-11	11-13	13-15	--- BGS
CS-304	East	10		12-14	16-18	20-22	24-26	28-30 Pad
CS-304	East		6.75	3-5	9-11	13-15	17-19	21-22 BGS
CS-305	East	10		12-14	16-18	20-22	24-26	28-30 Pad
CS-305	East		6.87	3-5	9-11	13-15	17-19	21-22 BGS
CS-306	East	10		12-14	16-18	20-22	24-26	28-30 Pad
CS-306	East		4.19	3-5	9-11	13-15	17-19	21-22 BGS
CS-307	East	10		12-14	16-18	20-22	24-26	28-30 Pad
CS-307	East		4.39	3-5	9-11	13-15	17-19	21-22 BGS
CS-308	East	10		12-14	16-18	20-22	24-26	28-30 Pad
CS-308	East		3.49	3-5	9-11	13-15	17-19	21-22 BGS
CS-309	East	10		12-14	16-18	20-22	24-26	28-30 Pad
CS-309	East	---	---	3-5	9-11	13-15	17-19	21-22 BGS
CS-102	East	10		10-12	14-16	17-19	---	--- Pad
CS-102	East		6.93	3-5	7-9	11-13	---	--- BGS
202	East	10		10-12	14-16	17-19	---	--- Pad
202	East		7.07	3-5	7-9	11-13	---	--- BGS
CS-101S	Southeast	4		4-6	6-8	10-12	---	--- Pad
CS-101S	Southeast		6.6	2-4	4-6	6-8	10-12	--- BGS
CS-117	Northeast Pad	5.5		6-8	8-10	10-12	---	--- Pad
CS-117	Northeast Pad		6.21	6-8	8-10	10-12	---	--- BGS
CS-121		3.64		4-6	6-8	8-10	10-12	
CS-121		3.64	3.64	2-4	4-6	6-8	10-12	--- BGS

Samples to be analyzed first.

Figures

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE
501167070-B2	--	--	--	--	-/-/--



LEGEND:

- PREVIOUS SAMPLE LOCATION
- COMPOSITE SAMPLE LOCATION
- NORTHEAST PAD AREA
- EAST AREA
- NORTH
- SOUTHEAST AREA
- CONCRETE CHIP SAMPLE LOCATION

SCALE
0 5 10 FEET

REFERENCE:

REFERENCE ALL DRAWINGS FROM OTHER SOURCES HERE.

Shaw® a world of Solutions™

MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 1
PROPOSED FILL MATERIAL
COMPOSITE SAMPLE
FORMER GST STEEL
KANSAS CITY, MISSOURI

File: O:\Project\501167070\501167070-B2.dwg
User: greg.jones Feb 13, 2013 - 10:43am Layout: Layout1-11 x 17

LEGEND:

- FORMER SUBSTATION
- EXCLUSION ZONE SECURITY FENCE
- DECONTAMINATION AREA
- TRACT F-7

N

0 25 50 100

Feet

Shaw® a world of Solutions™

MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 3
SITE DETAILS MAP
FORMER GST STEEL
KANSAS CITY, MISSOURI

Appendices

Appendix A

Standard Operating Procedures

1. PURPOSE

This procedure is intended to communicate the requirements for selection, use, and maintenance of all field logbooks. Field logbooks are often used to document observations, sampling information, and other pertinent information on project sites. They are considered legal documents and should be maintained and documented accordingly as part of the project file.

2. SCOPE

This procedure is applicable to all Shaw E & I site operations where field logbooks are utilized to document all site activities and pertinent information.

3. REFERENCES

- Nielsen Environmental Field School, 1997, *Field Notebook Guidelines*

4. DEFINITIONS

- **Significant detail**—Any piece and/or pieces of information or an observation that can be considered pertinent to the legal reconstruction of events, description of conditions, or documentation of samples and/or sampling procedures.
- **Significant event**—Any event or events that could influence or be considered pertinent to a specific task or function and therefore require documentation in the Field Logbook.
- **Field Logbook**—Logbooks used at field sites that contain detailed information regarding site activities that must include dates, times, personnel names, activities conducted, equipment used, weather conditions, etc. Field logbooks can be used by a variety of different field personnel and are part of the project file.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be directed to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

6.1 General

Each site or operation, as applicable, will have one current Logbook, which will serve as an index of all activities performed at the site or in the task performance. The Logbook is initiated at the start of the first applicable activity. Summary entries are made for every day that covered activities take place. Multiple field logbooks may be used depending upon the number of different types of field personnel conducting work and the various activities at the site. These field logbooks and the site logbooks shall be made part of the project files.

Information recorded in field logbooks includes observations (significant events and details), data, calculations, time, weather, and descriptions of the data collection activity, methods, instruments, and results. Additionally, the field logbook may contain descriptions of wastes, biota, geologic material, and site features including sketches, maps, or drawings as appropriate.

6.2 Equipment and Materials

- Logbook(s), bound with numbered pages, hard-covered, waterproof preferred. One per project or separate significant task (example-treatment residual composite collection).
- Indelible black or dark blue ink pen
- Other items needed to perform required tasks: compass, ruler, calculator, etc.

6.3 Preparation

Site personnel responsible for maintaining field logbooks must be familiar with the SOPs for all tasks to be performed.

Field logbooks are project files and should remain with project documentation when not in use. *Personnel should not keep Field logbooks in their possession when not in use. Field logbooks should only leave the project site for limited periods, and they should always be returned to the site files or the designated on-site location (Sampler's Trailer, etc.).*

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the field logbook.

The front cover shall include the following information:

- Project Number
- Project Name and Task(s) included in logbook
- Dates covered by logbook—the starting date must be entered on the first day of use
- Logbook number—if more than one logbook will be needed to cover project/task(s)

The inside front cover shall contain a listing and sign-off of each person authorized to make entries and/or review the logbook. All persons who make entries or review/approve such entries must signify their authority to enter into the logbook via their signature and the date of their signing on the inside front cover. If initials are used for entries instead of full names, the initials must be entered beside the full name on the inside cover.

6.4 Operation

The following requirements must be met when using a field logbook:

- Record significant details and/or events, work, observations, material quantities, calculations, drawings, and related information directly in the field logbook. If data-collection forms are in

use, the information on the form need not be duplicated in the field logbook. However, any forms used to record site information *must be referenced* in the field logbook.

- Information must be factual and unbiased.
- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.
- Write in black or dark blue indelible ink.
- Do not erase, scribble over, or blot out any entry. Do not use White-Out or like correction items. Before an entry has been signed and dated, changes may be made; however, care must be taken not to obliterate what was written originally. Indicate any deletion by a single line through the material to be deleted. Any change shall be initialed and dated. Error codes (Attachment 1) should be added to the end of the deleted entry. All error codes should be circled.
- Do not remove any pages from the book.
- Do not use loose paper and copy into the field logbook later.
- Record sufficient information to completely document field activities and all significant details/events applicable to the project/task(s) covered by the logbook.
- All entries should be neat and legible.

Specific requirements for field logbook entries include the following:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial, date, and if used, code all changes properly.
- Draw a diagonal line through the remainder of the final page at the end of the day.
- Record the following information on a daily basis:

  a) Date and time

  b) Name of individual making entry

  c) Detailed description of activity being conducted including well, boring, sampling, location number as appropriate

  d) Unusual site conditions

  e) Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction and speed) and other pertinent data

  f) Sample pickup (chain-of-custody form numbers, carrier, time)

  g) Sampling activities/sample log sheet numbers

  h) Start and completion of borehole/trench/monitoring well installation or sampling activity

  i) Health and Safety issues, such as PPE upgrades, monitoring results, near-misses, and incidents associated with the logbook areas

  j) Instrumentation calibration details

Entries into the field logbook shall be preceded with the time of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form required by an operating procedure. In such cases, the field logbook must reference the automatic data record or form.

While sampling, make sure to record observations such as color and odor. Indicate the locations from which samples are being taken, sample identification numbers, the order of filling bottles, sample volumes, and parameters to be analyzed. If field duplicate samples are being collected, note the duplicate pair sample identification numbers. If samples are collected that will be used for matrix spike and/or matrix spike/matrix spike duplicate analysis, record that information in the field logbook.

A sketch of the station location may be warranted. All maps or sketches made in the field logbook should have descriptions of the features shown and a direction indicator. There must be at least one fixed point with measurements on any map drawn. Maps and sketches should be oriented so that north is towards the top of the page.

Other events and observations that should be recorded include (but are not limited to) the following:

- Changes in weather that impact field activities
- Visitors to the site associated with the covered task(s). Note their time of arrival and departure and provide a brief summary of their purpose on site.
- Subcontractor activities applicable to the covered task(s)
- Deviations from procedures outlined in any governing documents, including the reason for the deviation. Deviations from procedures must be accompanied with the proper authorization.
- Significant events that may influence data, such as vehicles in the vicinity of VOC sampling efforts
- Problems, downtime, or delays
- Upgrade or downgrade of personal protective equipment

6.5 Post-Operation

To guard against loss of data due to damage or disappearance of field logbooks, all original completed logbooks shall be securely stored by the project. All field logbooks will be copied at the end of each work shift and attached to the daily reports.

At the conclusion of each activity or phase of site work, the individual responsible for the field logbook will ensure that all entries have been appropriately signed and dated and that corrections were made properly (single lines drawn through incorrect information, initialed, coded, and dated). The completed field logbook shall be submitted to the project records file.

6.6 Restrictions/Limitations

Field logbooks constitute the official record of on-site technical work, investigations, and data collection activities. Their use, control, and ownership are restricted to activities pertaining to specific field operations carried out by Shaw personnel and their subcontractors. They are documents that may be used in court to indicate and defend dates, personnel, procedures, and techniques employed during site activities. Entries made in these notebooks should be factual,

clear, precise, and as non-subjective as possible. Field logbooks, and entries within, are not to be utilized for personal use.

7. ATTACHMENTS

- Attachment 1, Common Data Error Codes

8. FORMS

None

9. RECORDS

- Field Logbook

10. REVISION HISTORY AND APPROVAL

Revision Level Revision Date	Revision Description	Responsible Manager
00 6/5/2003	Initial Issue	N/A
01 9/8/2006	New template, new numbering of procedure, Section 1 Purpose- content added, Section 2 edited, Section 4-Definitions edited. Sections 6.2, 6.3, 6.4, 6.5 and 6.6 were all edited.	Guy Gallello
02 8/25/2011	Modified format only to align with Governance Management framework	Scott Logan

Attachment 1
Common Data Error Codes

COMMON DATA ERROR CODES

RE	Recording Error
CE	Calculation Error
TE	Transcription Error
SE	Spelling Error
CL	Changed for Clarity
DC	Original Sample Description Changed After Further Evaluation
WO	Write Over
NI	Not Initialed and Dated at Time of Entry
OB	Not Recorded at the Time of Initial Observation

All Error Codes should be circled.

1. PURPOSE

The purpose of this procedure is to provide the requirements for completion of written Chain of Custody (COC) documentation and to provide a suggested Chain of Custody Form for project use.

2. SCOPE

This procedure is applicable to all Shaw E & I efforts where samples are transferred among parties, including to off-site testing facilities. Adherence to this procedure is not required whenever the same individual/team is performing the sampling and testing within the same workday, and transfer to the testing process is being documented by other means, e.g. sampling and then field-screening in a mobile laboratory.

3. REFERENCES

- U.S. Environmental Protection Agency, 1986, *Test Methods for Evaluating Solid Waste; Physical/Chemical Methods, SW-846*, Third Edition.
- U.S. Army Corps of Engineers, *Requirements for the Preparation of Sampling and Analysis Plans*, EM200-1-3.
- Shaw E & I, 2002, *Sampler's Training Course Handout.*

4. DEFINITIONS

- **Custody**—The legal term used to define the control and evidence traceability of an environmental sample. A sample is considered to be in an individual's custody when it is in actual physical possession of the person, is in view of the person, is locked in a container controlled by the person, or has been placed into a designated secure area by the person.
- **Chain of Custody Form**—A form used to document and track the custody and transfers of a sample from collection to analysis or placement in a designated secure area within the testing facility.
- **COC Continuation Page**—Additional page(s) that may be included with a Chain of Custody form. The continuation page(s) contain the information on additional samples contained within the *same* cooler/shipping container associated with the cooler/shipping container Chain of Custody form.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be directed to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw E & I employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

6.1 Documentation

All Chain of Custody documentation must be completed in indelible ink. All corrections must be performed using standard single-line cross-out methods, and the initials of the individual making the change must be included beside the corrected entry.

6.2 Continuation Pages

Continuation pages may be utilized for shipping containers/coolers with sufficient samples/sample containers that all of the lines of the Chain of Custody form are used before the documentation of the cooler/shipping container is complete. The number of pages in total must be filled out. *All samples entered onto a Continuation Page must be included in the same cooler/shipping container as those on the Chain of Custody form itself.*

6.3 Header Information

- Each Chain of Custody form must be assigned a unique Reference Document Number–use the Project/proposal number followed by a unique numeric sequence or current date (if only one cooler sent per day). Continuation Pages should contain the same Document Reference Number as the Chain of Custody form that they are associated with. The project team should maintain a log of Chain of Custody Reference Document Numbers.
- The page identifier and total page count section must be completed. Total pages include the Chain of Custody form and any attached Continuation Pages.
- Project number, name, and location information must be completed for all forms.
- If available, the laboratory Purchase Order Number should be included on the appropriate line.
- The name and phone number of the *Project Contact* should be included; the Project Contact should be a responsible individual that the laboratory may access to address analytical issues. This person is usually the analytical lead for the project.
- The *Shipment Date* should be provided on the applicable lines.
- If shipping by carrier, the *Waybill/Airbill Number* must be included. Note: couriers will not sign custody documents. Therefore, inclusion of the waybill/airbill number on the Chain of Custody is the *only* means of documenting the transfer to the carrier.
- Laboratory Destination and Contact information should be provided.
- The Sampler(s) names should be provided on the appropriate line. This line should include all persons whose initials appear on any of the sample containers, to provide the laboratory a means of cross-referencing containers.
- The "Send Report To" information should be completed. If multiple reports/locations are needed, the information should be provided on a separate page included with the Chain of Custody documents.

6.4 Sample Information Section–Including on Continuation Page(s)

During actual sampling, each sample must be entered on the COC form at the time of collection in order to document possession. The sampler must not wait until sampling is completed before entering samples on the COC.

- Complete the *Sample ID Number* for each line. If there are multiple container types for a sample, use additional lines to indicate the needed information.
- Ensure that the *Sample Description* matches the description on the sample label–the laboratory will use this information for cross-referencing.
- Provide the *Collection Date* and *Time*. These must match those on the sample label and Field Logbook/Logsheets.
- Indicate whether the sample is a Grab or Composite sample.
- Indicate the *Matrix* of the sample. Use the Matrix Codes listed on the Chain of Custody form.
- Indicate the *Number of Containers* and the *Container Type*. If a sample has multiple container types, use multiple lines and cross-out the information spaces to the left of the container blocks. *Failure to do this may cause the laboratory to log-in each container type as a separate sample/lab-ID, resulting in a confused report and invoice.*
  - Alternatively, if each sample has the same number/type container types, use "various" in the *Container Type* block and provide detail in the *Special Instructions* section, e.g., "Each sample consists of one 16-oz jar, two pre-weighed VOC w/DI water, and one pre-weighed VOC w/Methanol."
- Check the appropriate *Preservative* box for each line/container type.
- Write in and check the *Analyses Requested* boxes for each line/container type. The appropriate method number (e.g., EPA Method 8260C) must be written as well as the method name.
- Indicate the *Turn-around Time Requested* for each sample.
- Use the *Special Instructions* section to provide important information to the laboratory, e.g., samples that may require dilution or samples that will need to be composited by the laboratory. This section may also be used to inform the laboratory of additional information contained in attachments to the Chain of Custody package.
- Circle the appropriate *QC/Data Package Level* requested.

6.5 Custody Transfer Section

- The first *Relinquished By* space must be completed by the individual who will either transfer the samples or seal the shipping container.
- If the samples will be transferred to a courier, write the courier/carrier company in the *Received By* box and enter the Date and Time that the shipping container was closed.
- All other transfers must be performed in person, and the Relinquisher must witness the signing by the Receiver.
- A copy of the Chain of Custody form and all associated Continuation Pages should be maintained in the project files.

7. ATTACHMENTS

None

8. FORMS

- EID-FS-003.01, Shaw E & I Chain of Custody Form
- EID-FS-003.02, Shaw E & I COC Continuation Page

9. RECORDS

- EID-FS-003.01, Chain of Custody Form
- EID-FS-003.02, Chain of Custody Continuation Page(s)

10. REVISION HISTORY AND APPROVAL

Revision Level Revision Date	Revision Description	Responsible Manager
00 07/22/2003	Initial Issue	N/A
01 09/08/2006	New template, new numbering of procedure, Section 6.3 was edited, content was added in Section 6.4	Guy Gallello
02 08/25/2011	Modified format only to align with Governance Management framework	Scott Logan

STANDARD OPERATING PROCEDURE

Subject: Sample Labeling

1. PURPOSE

The purpose of this procedure is to provide the requirements for completion and attachment of sample labels on environmental sample containers.

2. SCOPE

This procedure is applicable to all Shaw E & I projects/proposals where samples will be collected.

3. REFERENCES

- U.S. Environmental Protection Agency, 1986, *Test Methods for Evaluating Solid Waste; Physical/Chemical Methods*, SW-846, Third Edition.
- U.S. Army Corps of Engineers, *Requirements for the Preparation of Sampling and Analysis Plans*, EM200-1-3
- Shaw E & I, 2002, Sampler's Training Course Handout.

4. DEFINITIONS

- **Sample Label**—Any writing surface with an adhesive backing that can be used to document sample identification information. The sample label is attached to the sample container as a means of identification and, in some commercially available or laboratory-supplied containers, may be pre-attached. All Shaw E & I strategic alliance laboratories provide sample labels or pre-labeled containers in their sample container supply kits.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be directed to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw E & I employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw E & I employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

- All sample labels must be completed in indelible ink. All corrections must be performed using standard single-line cross-out methods, and the initials of the individual making the change must be included beside the corrected entry.
- Sample labels should be completed and attached as samples are collected. Do not wait until final packaging to attach and/or complete the sample labels.
- Sample labels must be attached to the non-sealing portion of the container. Do not place labels on or across sample container caps.
- If the laboratory has provided pre-labeled containers, make sure to fill one for each parameter set needed. Laboratory pre-labeled containers are often bar-coded and it is important to provide a complete container set for each sample.
- The following information must be recorded on the Sample Label:
  - Sample Identification Number
  - Date and Time collected
  - Initials of person(s) responsible for collection
- If a space is provided, the *Analysis Requested* should also be added.
- If a *Description* is provided, remember it must match that on the Chain of Custody form for cross-referencing purposes.
- Cover the completed and attached label with clear plastic tape to prevent bleeding of the ink if it becomes wetted. *Do **not** perform this step for pre-weighed VOC vials, as the final weight values will be influenced by the mass of the tape. Protect these containers by enclosing the rack/holder in a plastic bag within the cooler.*

7. ATTACHMENTS

None.

8. FORMS

None.

1. PURPOSE

The purpose of this procedure is to establish the method for homogenizing samples prior to containerization. Proper homogenization is very important because it helps ensure that sample aliquots are representative of the whole collected sample and helps minimize sampling error so that other errors included in the measurement process, such as laboratory sample preparation and test measurement, can be better assessed.

2. SCOPE

This procedure applies to Shaw Environmental & Infrastructure (Shaw E & I) personnel responsible for the collection of environmental samples. The sample matrix must be amenable to mixing. This SOP applies to the collection of samples that are to be tested for all analytes except volatile analytes.

3. REFERENCES

- American Society for Testing and Materials (ASTM), 1998, Reducing Samples of Aggregate to Testing Size, C702.
- U.S. Army Corps of Engineers, Requirements for the Preparation of Sampling and Analysis Plans, EM 200-1-3, Section E-2, Homogenizing Techniques.

4. DEFINITIONS

- **Homogenize**—The use of physical mixing motions to make a uniform sample matrix.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

Sampling equipment materials shall be selected so as to minimize contamination of samples. Sampling equipment shall be either new (never used previously), documented to have been decontaminated, or dedicated to each specific sampling point. Samples for organic

constituent/compound analysis should be collected and mixed using non-reactive material such as glass or stainless steel bowls, trowels, and/or spoons. Samples for metals analysis should be collected and mixed using equipment made of stainless steel, glass, or Teflon®.

Certain types of solid matrices may not be amenable to mixing using conventional techniques. For example, certain solids may require grinding and thorough mixing to ensure that the analytes of interest within the sample are homogeneously distributed. It is extremely important that soil and sediment samples be homogenized to ensure that the entire sample is as representative as possible of the media being sampled.

6.1 Solid Samples

The following two methods are examples for homogenizing solid samples. Other homogenization techniques may be employed using approved standard methods such as ASTM C702, Reducing Samples of Aggregate to Testing Size.

6.1.1 Quartering

- Place the sample on a hard, clean, level surface such as a pan. If such a surface is too small for the desired quantity, a clean sheet of plastic may be used.
- Mix the solid material by turning the entire quantity over three times with a trowel or shovel. For the third time, shovel the material into a cone-shaped pile.
- Carefully press down on the apex of the pile to create a soil layer of uniform thickness and diameter.
- Divide the material in the sample pan or on the plastic into quarters

  Option 1

  - Mix each quarter individually
  - Then mix two quarters to form halves
  - Mix each formed half and then fill the appropriate sample jars/containers

  Option 2

  - Remove two diagonally opposite quarters including any fine material
  - Mix the remaining material, build it into a cone, and press down to flatten as before
  - Divide the flattened material into quarters, discard two diagonally opposing sections, and repeat
  - Repeat the process until only enough sample remains to fill the required containers and proceed to fill the sample jars.

6.1.2 Mixing in a Bowl

- Place the sample in a bowl. Samples for organic constituent/compound analysis should be mixed using bowls and stirrers made of glass or stainless steel, while samples for metals analysis should be mixed using equipment made of glass, stainless steel, or hard plastic. Make sure the bowl is large enough to accommodate the sample, with extra volume to allow for mixing the sample.
- Mix the sample with the stirrer. If round bowls are used for sample mixing, adequate mixing is achieved by stirring the material in a circular fashion, reversing direction, and occasionally turning the material over. High moisture samples are more difficult to homogenize. Use an

adequate mixing motion for as long as needed to determine by visual observation that the sample media has taken on a uniform appearance.

6.2 Liquid Samples

Most aqueous samples do not require homogenization since water is well mixed due to diffusion and bulk convection. If the sample matrix is a viscous liquid, semi-solid, or an aqueous one with suspended solids, the sample will require mixing.

Do **not** shake the sample and do not agitate the sample in **any** way if collecting for volatile parameters. Volatile sample containers should be either filled directly from the sample source or if transferring from a large container, such as an automatic sampler reservoir, filled first and **without agitation**.

For non-volatile parameters, mix either using an appropriate stirrer or by gentle swirling and then immediately transfer the material into the appropriate containers. The sample should be mixed frequently during the container-filling step, in particular if there are a large number of containers, so that the condition of the bulk sampled fluid will be approximately the same when each parameter-specific sample container is filled.

7. ATTACHMENTS

None

8. FORMS

None

9. RECORDS

None

10. REVISION HISTORY AND APPROVAL

Revision Level Revision Date	Revision Description	Responsible Manager
00 06/05/2003	Initial Issue	N/A
01 09/08/2009	Updated template and changed numbering of procedure, edited Section 1-Purpose and Section 2-Scope, deleted Section 3.1, which was misc. matrix sampling SOPs to which sample mixing/homogenization may apply, Section 6.1 was broken down into subsections, Section 6.2 was converted from Aquous Samples to Liquid Samples and content was added.	Guy Gallello
02 08/25/2011	Modified format only to align with Governance Management Framework	Scott Logan

1. PURPOSE

This procedure is intended to provide guidelines for the compositing of samples collected in the course of environmental program activities. Composites represent the average distribution of properties and can be used to reduce analytical costs or represent well-defined decision boundaries.

2. SCOPE

This procedure applies to the compositing of solid and liquid samples where no project-specific process is in place. Field composite methods are not appropriate for Volatile Organic Compounds (VOC) analysis of solids. Composites for these methods must be laboratory derived using either individual grab extracts or other laboratory methods.

3. REFERENCES

- U.S. Environmental Protection Agency, 1987, *Compendium of Superfund Field Operations Methods*, EPA 540/P-87/001a, OSWER 9355.0-14, Washington, DC.
- Shaw E & I Standard Operating Procedure EID-FS-010, *Sample Mixing/Homogenization.*

4. DEFINITIONS

- **Composite Sample**—A sample that is comprised of roughly equal amounts of discrete grabs from a set of sample locations or time/flow increments known as a *sample group.*
- **Sample Group**—A predetermined number or time/area span of discrete samples, which is composited into one sample for analytical purposes.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw E & I employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw E & I employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager or designee is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

The discrete samples that are used to prepare a composite sample must be of equal volume and must each be collected in an identical manner. Field documentation must clearly indicate the composite elements on either a map or a composite logsheet. There are several types of composite samples.

Flow-proportioned composite—Flow-proportioned composite samples are collected proportional to the flow rate during the sampling period by either a time-varying/constant-volume or time-constant/varying-volume method. Flow-proportioned composite samples are typically collected using automatic samplers paced by a flow meter. This sampling method is commonly used for wastewaters.

Time composite—A time composite sample is composed of a discrete number of grab samples collected at equal time intervals during the sampling period. Time composite sampling is often used to sample wastewater discharges or streams.

Volume/mass composite—A volume/mass composite is composed of a discrete number of grab samples collected at defined volume or mass intervals. Volume/mass composite sampling is often used to sample the output of a process system such as a Thermal Destruction Unit or pug mill.

Area composite—Area composite samples are samples collected from individual grab samples located on a regularly spaced grid or along a pile at defined locations and depths. Each of the grab samples must be collected in an identical fashion and must be of equal volume.

Vertical or Depth composite—Vertical composites are composed of individual grab samples collected across a vertical cross section. Like area composites, the grab samples must be collected in an identical fashion and must be of equal volume. Soils and sediments can be used to create vertical composites.

6.1 Solid Composites

- To ensure the integrity of the composite, all discrete grab samples must be collected in an identical manner.
- Composite samples can be created by combining discrete grab samples into the same mixing/holding container as they are collected or by combining and mixing equal aliquots of containerized and homogenized discrete grab samples.
- Remove coarse fragments and organic material from the mixing bowl. Homogenize the sample as specified in SOP FS010, Sample Mixing/Homogenization.
- Remove sample aliquots and place into the appropriate sample containers for shipment to the laboratory.
- Label the sample and document the sampling event according to the project procedures.
- Package/ship the composite sample as required.

6.2 Liquid Composites

- Liquid composite samples should be created by combining equal aliquots of discrete samples.
- Assemble the containers that will comprise a given composite.
- Swirl or stir the individual containers to homogenize the contents just prior to removing the measured aliquots.

- Using clean glass pipets, deliver equal volumes from each grab container to the composite sample container that is to be shipped to the lab. For example, if there are five grab samples, and the composite sample requires 100 mL for the parameter of interest, pipet 20 mL from each of the grab samples into the composite sample container.
- Alternatively, measured volumes can be determined via a graduated cylinder/beaker and combined. The measuring container should be decontaminated between composites.
- Cap/seal the composite container and swirl to agitate. Stirring should be avoided as it increases the risk of introducing contamination to the sample.
- Label the sample(s), document the event, and package/ship the sample(s) as required.

7. ATTACHMENTS

None

8. FORMS

None

9. RECORDS

None

10. REVISION HISTORY AND APPROVAL

Revision Level / Revision Date	Revision Description	Responsible Manager
00 08/14/2003	Initial Issue	N/A
01 09/08/2006	Updated template and numbering of procedure changed, updated Section 2-Scope, added content to 6.1 and 6.2.	Guy Gallello
02 08/25/2011	Modified format only to align with Governance Management framework.	Scott Logan

1. PURPOSE

The purpose of this procedure is to provide general instructions in the packaging and shipping of non-hazardous samples. The primary use of this procedure is for the transportation of samples collected on site to be sent off site for physical, chemical, and/or radiological analysis.

2. SCOPE

This procedure applies to the shipping and packaging of all non-hazardous samples. Non-hazardous samples are those that do not meet any hazard class definitions found in 49 CFR 107-178, including materials designated as Class 9 materials and materials that represent Reportable Quantities (hazardous substances) and/or materials that are not classified as *Dangerous Goods* under current IATA regulations.

In general most soil, air, and aqueous samples, including those that are acid or caustic preserved do **not** qualify as *hazardous materials* or *dangerous goods*. An exception is methanolic soil VOC vials: these containers are flammable in any quantity and **must** be packaged, shipped, and declared as *Dangerous Goods* whenever transported by air.

The Class 9 "Environmentally Hazardous" designation should only be applied to samples if they are known or suspected (via screening) to contain a sufficient concentration of contaminant to pose a health and/ or environmental risk if spilled in transport. Samples for which screening has shown a potential hazard (i.e. flammability) or those that are derived from a known hazard, including a site/facility with confirmed contamination by an *infectious substance* must also be shipped in accordance with the applicable DOT/IATA requirements. Refer to Shaw E & I SOP FS013.

Improper shipment of hazardous materials, especially willful misrepresentation and shipment as non-hazardous materials, is a violation of federal law and is punishable by fines and possible imprisonment of the guilty parties. It is also a violation of Shaw E & I policy and can result in disciplinary action up to and including termination of employment.

3. REFERENCES

- U.S. Army Corps of Engineers, 2001, *Requirements for the Preparation of Sampling and Analysis Plans*, EM200-1-3, Washington, D.C.
- U.S. Department of Transportation Regulations, 49 CFR Parts 108-178
- International Air Transport Association (IATA), *Dangerous Goods Regulations*, current edition.

4. DEFINITIONS

- **Cooler/Shipping Container**—Any hard-sided insulated container meeting DOT's or IATA's general packaging requirements.
- **Bubble Wrap**—Plastic sheeting with entrained air bubbles for protective packaging purposes.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

6.1 Packaging

- Use tape and seal off the cooler drain on the inside and outside to prevent leakage.
- Place packing material on the bottom on the shipping container (cooler) to provide a soft impact surface.
- Place a large (30-55 gallon or equivalent) plastic bag into the cooler (to minimize possibility of leakage during transit).
- Starting with the largest glass containers, wrap each container with sufficient bubble wrap to ensure the best chance to prevent breakage of the container.
- Pack the largest glass containers in the bottom of the cooler, placing packing material between each of the containers to avoid breakage from bumping.
- Double-bag the ice (chips or cubes) in gallon- or quart-sized resealable plastic freezer bags and wedge the ice bags between the sample bottles.
- Add bagged ice across the top of the samples.
- When sufficiently full, seal the inner protective plastic bag, and place additional packing material on top of the bag to minimize shifting of containers during shipment.
- Tape a gallon-sized resealable plastic bag to the inside of the cooler lid, place the completed chain of custody document inside, and seal the bag shut.
- Tape the shipping container (cooler) shut using packing tape, duct tape, or other tear-resistant adhesive strips. Taping should be performed to ensure the lid cannot open during transport.
- Place a custody seal on two separate portions of the cooler, to provide evidence that the lid has not been opened prior to receipt by the intended recipient.

6.2 Labeling

- A "This Side Up" arrow should be adhered to all sides of the cooler, especially ones without obvious handles.
- The name and address of the receiver and the shipper must be on the top of the cooler.
- The airbill must be attached to the top of the cooler.

6.3 Shipping Documentation

- A Cooler Shipment Checklist (Attachment 1) should be completed and kept in the project file.

7. ATTACHMENTS

- Attachment 1, Shaw E & I Cooler Shipment Checklist

8. FORMS

None

9. RECORDS

- Chain of Custody Form
- Chain of Custody Continuation Page(s)
- Cooler Shipment Checklist

10. REVISION HISTORY AND APPROVAL

Revision Level / Revision Date	Revision Description	Responsible Manager
00 / 06/05/2003	Initial issue	N/A
01 / 09/08/2006	Updated template and numbering of procedure, content was added to Section 2-Scope	Guy Gallello
02 / 08/25/2011	Modified format only to align with Governance Management framework.	Scott Logan

Attachment 1
Sample Shipment Checklist

Project Name _____ Project Number _____

Address _____ Date_____ Time _____

City, State, Zip _____ Fax No._____

Site Contact No. _____

SAMPLE CHECKLIST	YES	NO	COMMENTS
SAMPLE LIDS ARE TIGHT AND CUSTODY SEALS IN PLACE?	❒	❒	
ARE ALL SAMPLE NUMBERS, DATES, TIMES AND OTHER LABEL INFORMATION LEGIBLE AND COMPLETE?	❒	❒	
HAVE ALL SAMPLE NUMBERS, DATES, TIMES AND OTHER SAMPLING DATA BEEN LOGGED INTO THE SAMPLE LOG BOOK?	❒	❒	
DO SAMPLE NUMBERS AND SAMPLE DESCRIPTIONS ON THE LABELS MATCH THOSE ON THE COC?	❒	❒	
HAVE THE SAMPLES BEEN PROPERLY PRESERVED?	❒	❒	
HAVE THE CHAIN OF CUSTODIES BEEN FILLED OUT COMPLETELY AND CORRECTLY?	❒	❒	
DOES THE ANALYTICAL SPECIFIED ON THE COC MATCH THE ANALYTICAL SPECIFIED IN THE SCOPE OF WORK?	❒	❒	
HAVE THE COC'S BEEN PROPERLY SIGNED IN THE TRANSFER SECTION?	❒	❒	

PACKAGING CHECKLIST	YES	NO	COMMENTS
HAS EACH SAMPLE BEEN PLACED INTO AN INDIVIDUAL PLASTIC BAG?	❒	❒	
HAS THE DRAIN PLUG OF THE COOLER BEEN TAPED CLOSED WITH WATER PROFF TAPE FROM THE INSIDE?	❒	❒	
HAVE ALL THE SAMPLES BEEN PLACED INTO THE COOLER IN AN UPRIGHT POSITION?	❒	❒	
IS THERE ADEQUATE SPACING OF SAMPLES SO THAT THEY WILL NOT TOUCH DURING SHIPMENT?	❒	❒	
HAVE AN ADEQUATE NUMBER OF BLUE ICE PACKS OR WATER ICE BEEN PLACED AROUND AND ON TOP OF THE SAMPLE?	❒	❒	
HAS FRESH BLUE ICE OR WATER ICE BEEN ADDED TO THE COOLER THE DAY OF THE SHIPMENT?	❒	❒	
HAS THE COOLER BEEN FILLED WITH ADDITIONAL CUSHIONING MATERIAL?	❒	❒	
HAS THE COC BEEN PLACE IN A ZIPLOCK BAG AND TAPED TO THE INSIDE OF THE LID OF THE COOLER?	❒	❒	
HAVE CUSTODY SEALS BEEN PLACED ONTO THE LID?	❒	❒	
HAS THE COOLER BEEN LABELED "THIS SIDE UP"?	❒	❒	
IF REQUIRED, HAS THE COOLER BEEN LABELED WITH THE DOT PROPER SHIPPING NAME, UN NUMBER AND LABEL?	❒	❒	
HAS THE LABORATORY PERFORMING THE ANALYSES BEEN NOTIFIED OF THE SHIPMENT OF SAMPLES?	❒	❒	

PROBLEMS/RESOLUTIONS: _____

_____

_____

PREPARED BY: _____ SIGNATURE _____

1. PURPOSE

This procedure is intended to provide minimal guidelines for the decontamination of contact sampling equipment. Contact sampling equipment is equipment that comes in direct contact with the sample or the portion of a sample that will undergo chemical analyses or physical testing.

2. SCOPE

This procedure applies to all instances where non-disposable direct contact sampling equipment is utilized for sample collection and no project-specific procedure is in place. This procedure is not intended to address decontamination of peristaltic or other sampling pumps and tubing. The steps outlined in this procedure must be executed between each distinct sample data point.

3. REFERENCES

- U.S. Environmental Protection Agency, Region 4, 2001, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, 980 College Station Road, Athens, Georgia. November.
- US Army Corp of Engineers, Washington, D.C., 2001, Requirements for the Preparation of Sampling and Analysis Plans (EM-200-1-3), February.

4. DEFINITIONS

- **Soap**—A standard brand of phosphate-free laboratory detergent, such as Liquinox®.
- **Organic Desorbing Agent**—A solvent used for removing organic compounds. The specific solvent would depend upon the type of organic compound to be removed. See Attachment 1 for recommendations.
- **Inorganic Desorbing Agent**—An acid solution for use in removing trace metal compounds. The specific acid solution would depend upon the type of inorganic compound to be removed. See Attachment 1 for recommendations.
- **Tap water**—Water obtained from any municipal water treatment system. An untreated potable water supply can be used as a substitute for tap water if the water does not contain the constituents of concern.
- **Distilled Water**—Water that has been purified via distillation. Distilled water can be purchased in most stores and is acceptable as a final rinse in non-trace analytical decontamination processes. Examples would include disposal profiling, HazCat, and other gross screening applications.
- **Analyte-free water**—Water that has been treated by passing through a standard deionizing resin column, and for organics either distillation or activated carbon units. At a minimum, the finished water should contain no detectable heavy metals or other inorganic compounds, and/or no detectable organic compounds (i.e., at or above analytical detection limits). Type I and Type II Reagent Grade Water meet this definition as does most laboratory-supplied blank water.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

Wear appropriate eye protection including safety goggles when working with corrosive liquids, especially when diluting concentrated materials to create low-percentage solutions and follow all project Health and Safety requirements. Decontamination wastes are to be recovered and handled as impacted project waste materials and must be disposed of in accordance with regulatory requirements.

A decontamination area should be established. Implements can either be immersed in a 5-gallon bucket containing each solution/rinse or the solutions can be contained in hand-held units made of an inert and compatible material; such as a Teflon™ wash bottle. The analyte-free water needs to be placed in a container that will be free of any compounds of concern.

Consult Attachment 1 for the decontamination solutions/solvents appropriate to the task. The minimum steps for decontamination are as follows:

1. Remove particulate matter and other surface debris by brushing and/or dipping in the soap solution.
2. Rinse thoroughly with tap water.
3. If necessary, rinse with other applicable solutions/solvents. If hexane is used, be sure to follow it with isopropyl alcohol to allow for the final water rinses to properly mix and contact the surface.
4. Final rinse three times to make sure all residual solutions/solvents are removed.
5. Place decontaminated equipment on a clean surface appropriate for the compounds of concern and allow to air dry.

7. ATTACHMENTS

- Attachment 1, Recommended Decontamination Procedures.

8. FORMS

None

9. RECORDS

None

10. REVISION HISTORY AND APPROVAL

Revision Level Revision Date	Revision Description	Responsible Manager
00 06/05/2003	Initial issue	N/A
01 09/08/2006	Updated template and updated numbering of procedure, Sections 1 and 2 minor edits, added definition for Distilled Water, Section 6- extensive content changes	Guy Gallello
02 08/25/2011	Modified format only to align with Governance Management Framework	Scott Logan

Attachment 1
Recommended Decontamination Procedures

Compound	Detergent Wash	Tap Water	Inorganic Desorbing Agent	Tap Water	Organic Desorbing Agent1	Final Water Rinse4	Air Dry
Organic Constituents							
Volatile Organic Compounds	✓	✓			Methanol Purge & Trap grade	✓	✓
Base Neutrals/Acid Extractables/PCBs/Pesticides	✓	✓			Hexane followed by Isopropyl Alcohol	✓	✓
Organic Bases[2]	✓	✓	1% nitric acid	✓	Isopropyl Alcohol	✓	✓
Organic Acids[3]	✓	✓	1% nitric acid		Isopropyl Alcohol	✓	✓
Inorganic Constituents							
Trace Metals and Radio Isotopes	✓	✓	10% Nitric acid -Trace metals grade	✓		✓	✓
Cations/Anions	✓	✓				✓	✓
Acidic Compounds	✓	✓				✓	✓
Basic Compounds (caustic)	✓	✓	1% nitric acid	✓		✓	✓

1 – All organic solvents must be Pesticide Grade or better. The selection of appropriate solvent rinses should first consider if a *known or suspected* contaminant requires removal from sampling equipment. Secondly, identify whether the subsequent analytical protocol would be impacted by the proposed solvent or an impurity thereof (e.g., residual acetone present in isopropyl alcohol would be measured with certain volatile organics analysis).

2 - Organic bases include amines, hydrazines.

3 - Organic acids include phenols, thiols, nitro and sulfonic compounds.

4- Use a grade of water appropriate to the application. For trace level analysis this must be Analyte Free Water. For non-trace applications store-bought distilled water is sufficient

Adapted from: Appendix E, Requirements for the Preparation of Sampling and Analysis Plans (EM-200-1-3), February 2001. US Army Corp of Engineers, Washington, D.C.

1. PURPOSE

The purpose of this document is to provide the methods and procedure for sampling of soils and other solids using hand auger techniques. Hand auger sampling can be used when matrices are composed of relatively soft and non-cemented formations, to reach depths of up to 5 feet below ground surface, dependent on site conditions. Samples for Volatile Organic Compound (VOC) analysis should not be collected via hand auger methods. However, a hand auger may be utilized to penetrate to and expose the undisturbed material at the desired depth for sampling by more applicable methods.

2. SCOPE

This procedure is applicable to all Shaw E & I projects where soil samples will be collected via hand auger methods and no project-specific procedure exists.

3. REFERENCES

- U.S. Army Corps of Engineers, 2001, *Requirements for the Preparation of Sampling and Analysis Plans*, Appendix C, SectionC.6, EM200-1-3, Washington, D.C.
- American Society of Testing and Materials, D1452-80 (re-approved 2000), *Standard Practice for Soil Investigation and Sampling by Auger Borings*, West Conshohocken, PA.

4. DEFINITIONS

- **Hand Auger**—A sample collection device consisting of metal rods with a T-bar handle and a detachable metal head. The auger head is a hollow metal tube with two cutting edges at the bottom curved into each other to hold the material pushed up into the tube as the auger is forced deeper. All trace environmental samples should be collected using stainless steel auger heads. See ASTM D1452 for a description of various types of augers available for use.
- **Sand Auger**—A type of auger with the cutting edges bent toward and touching each other. The design allows for the trapping of loosed materials in the auger tube.
- **Mud Auger**—A type of auger head with the top several inches open at the sides to allow for reduction of suction during removal from wetted and highly plastic materials, such as mud and lagoon solids.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for recording information in sufficient detail to provide objective documentation (checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

6.1 Equipment

The following equipment should be used when conducting hand auger sampling:

- Decontaminated commercial hand auger, stainless steel construction for trace environmental sampling (any of those mentioned in ASTM D1452 are acceptable). If samples will be collected at depth, the auger head will require decontamination prior to collection of the targeted-depth sample. Alternatively, one auger can be used to remove the material to the targeted depth, and the sample can be collected using a different, clean dedicated auger.
- Engineers rule or stiff measuring tape
- Stainless steel spoons or scoops–decontaminated or dedicated
- Decontaminated or dedicated stainless steel bowl

6.2 Sampling

The following procedure should be used for hand auger sampling:

1. Don a pair of clean gloves.
2. If desired, place plastic sheeting around the targeted location to keep sampled material in place. Use a knife to cut an access hole for the sample location.
3. Remove any surficial debris (e.g. vegetation, rocks, twigs) from the sample location and surrounding area.
4. Place the bucket of the hand auger on the ground with the teeth down, and, while holding the T-handle, rotate it in a clockwise direction while pushing straight downward until the bucket is full.
5. Extract the auger by pulling upward with a slight rocking or rotating motion (counter-clockwise) until the head is fully out of the hole.
6. Measure the depth of the sample bottom with the rule or tape and compare to the desired sampling depth.
7. Remove the soil with a spoon or scoop. If the material represents the desired sample, place it into the bowl. If it is not the material to be sampled, empty the auger bucket onto the ground or plastic and repeat steps 4 through 6 until the desired sample aliquot is collected, placing it into the sample bowl. Remember to either decontaminate the auger head or use a fresh one to collect the actual sample aliquot.
8. If collecting a sample for VOC analysis, expose the desired depth by following steps 4 through 6 and then collect the sample from undisturbed material, using a corer or syringe-type sampling device.

9. Homogenize the non-VOC sample and transfer the sample directly into the sample container(s). Cap the sample container(s), label, complete documentation, and place into the sample cooler.

10. Measure the depth from which the sample was taken and record it in the field logbook or sheet.

11. Repeat steps 4 through 10 for deeper samples from the same hole.

7. ATTACHMENTS

None

8. FORMS

None

9. RECORDS

- Measurements recorded in Field Logbook or Field Logsheet
- Field Logsheet

10. REVISION HISTORY AND APPROVAL

Revision Level / Revision Date	Revision Description	Responsible Manager
00 08/17/2003	Initial issue	N/A
01 09/08/2006	Updated template and numbering of procedure, Minor edits to Section 1-Purpose.	Guy Gallello
02 08/25/2011	Modified format only to align with Governance Management Framework	Scott Logan

1. PURPOSE

The purpose of this procedure is to provide the methods and procedures for collection of chip samples from surface and near-surface areas of hard porous materials such as concrete, brick, and wood. This procedure is applicable to sampling to determine surface to near-surface (½-inch) contaminant distribution.

2. SCOPE

This procedure is applicable to all Shaw E & I projects where chip samples of hard porous surfaces are collected and no project-specific procedure is in use.

3. REFERENCES

- U.S. Army Corps of Engineers, 2001, *Requirements for the Preparation of Sampling and Analysis Plans*, Appendix C, SectionC.7, EM200-1-3, Washington, D.C.

4. DEFINITIONS

- **Chip Sample**—A sample collected from and representative of the surface and near-surface properties of the sampled medium. Chip samples are usually collected from pads, walls, poles/ties, and other hard porous materials where contaminants may have penetrated slightly beyond the surface. They should not be used to characterize contaminant distribution/penetration beyond a half of an inch. In these cases, core samples are more appropriate.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be directed to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw E & I employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw E & I employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

Safety Note: *Proper PPE including a face shield should be worn when performing this procedure, especially on concrete surfaces. Chips and fine particles may enter the eyes or strike the face causing severe injury. Only trained individuals should operate a hammer drill. Keep non-involved personnel away from the sampling area.*

6.1 Equipment

The following equipment should be used when conducting chip sampling:

- Decontaminated stainless steel chisel and hammer, or electric hammer drill. For wood samples, a wood chisel must be used.
- Engineer's rule
- Bristle brush—do not use plastic bristles if sampling for PCBs or dioxins.
- Polyethylene plastic or other constructed 2- to 6-inch high barrier to prevent chips from flying out of sampling area. A plastic container with most of the bottom cut out to leave a working template area works well.
- Decontaminated or dedicated metal or polyethylene plastic dustpan
- Concrete patching material

6.2 Sampling

The following procedure should be used when conducting chip sampling:

1. Don a pair of clean gloves.
2. Place the barrier around the area to be sampled with the open area centered on the planned sampling location.
3. Use a hammer & chisel or a hammer drill to chip the sampling area to a depth of no more than ½-inch. Make sure that the chips are no more than ½-inch in size.
4. Remove the barrier and, using the brush, sweep all dust and fine particles onto the chip/sample pile.
5. Use the brush to sweep the sample onto the dustpan. Be careful to collect all particles and as much dust as practical.
6. Transfer the sample from the dustpan into the sample jar using the bristle brush. Label and document the sample.
7. Use the engineer's rule to measure the depth of the sample obtained.
8. Make a sketch of the sampling location in the field logbook or sheet.
9. Decontaminate or dispose of the sampling equipment.
10. Patch the sampling area, if desired.

7. ATTACHMENTS

None

8. FORMS

None

9. RECORDS

- Field Logbook or Field Logsheet

10. REVISION HISTORY AND APPROVAL

Revision Level Revision Date	Revision Description	Responsible Manager
00 08/17/2003	Initial issue.	N/A
01 09/21/2006	Updated template and numbering of procedure, Updated Section 2-Scope.	Guy Gallello
02 08/25/2011	Modified format only to align with Governance Management framework.	Scott Logan

STANDARD OPERATING PROCEDURE

Subject: Standards for Conducting Direct Push Drilling and Soil Sampling

1. PURPOSE

This procedure provides the standard practice for direct push drilling and soil sampling. The procedure provides the minimum required steps and quality checks that employees and subcontractors are to follow when performing the subject task.

This procedure may also contain guidance for recommended or suggested practice that is based upon collective professional experience. Recommended or suggested practice goes beyond the minimum requirements of the procedure and should be implemented when appropriate.

2. SCOPE AND RELATED STANDARDS

Geosciences Standard Operating Procedure (SOP) EI-GS021 describes standards for direct push drilling and soil sampling, and discusses how such drilling and sampling will be conducted and documented for projects executed by Shaw Environmental & Infrastrucure Inc. (Shaw E & I). Responsibilities of individuals performing the work are also detailed. Additional project-specific requirements for direct push drilling and soil sampling may be developed, as necessary, to supplement this procedure and to address project-specific conditions and/or objectives.

This SOP covers requirements for collection of soil and unconsolidated materials by direct push methods primarily for laboratory or other testing and for lithologic description or analysis (logging). It describes basic equipment and procedures and addresses aspects of the process where quality must be maintained. It does not address procedures for specific brands of equipment, or for uncommon purposes of boring or sampling. Other types of soil and rock sampling while drilling are addressed in other Shaw E & I technical SOPs.

3. REFERENCES (STANDARD INDUSTRY PRACTICES)

The methodology for direct push drilling and soil sampling should follow industry standard practices. The latest revision of the following references are relevant and useful for planning and conducting direct push drilling and soil sampling:

ASTM D 6282	Direct Push Soil Sampling for Environmental Site Characterizations
ASTM D 6286	Standard Guide for Selection of Drilling Methods for Environmental Site Characterization

4. DEFINITIONS

The following definitions are applicable to direct push drilling and soil sampling and this SOP.

- **Direct push drilling**—The creation of a boring by the displacement of soil without cutting or grinding and without the production of mechanically-altered soil (cuttings) at the ground surface. In direct push drilling, soil is displaced, primarily laterally, as a pipe or rod is forced vertically downward, creating a cylindrical space (i.e. a boring). Energy to create the boring may be generated from constant pressure (e.g., hydraulically-powered), vibration, or other means.

- **Slough**—Slough is soil or other earth material that has been dislodged from its original location within the boring and displaced elsewhere within the boring (usually to the bottom). The creation

and sampling of slough should be avoided, because slough has disturbed properties and is typically of uncertain origin with respect to depth. The presence of slough also impedes proper abandonment of borings.

- **Conductor Casing**—Conductor casing is drill pipe that is extended down into the ground as a boring is advanced, to prevent sidewall material from falling into the borehole and covering the in-place soil material that constitutes the bottom of the boring. Conductor casing is usually removed when a borehole is being abandoned.
- **Sample**—A mass of soil or earthen material that has been removed from the boring from a known depth, has had little internal disturbance, and may be considered representative of the in-situ earthen material from a known depth and representative with respect to the intended tests or properties of interest.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Geosciences Discipline Lead is responsible for the development, maintenance, and revision of this procedure. Any questions, comments, or suggestions regarding this technical SOP should be directed to the Geosciences Discipline Lead. The Geosciences Discipline Lead's location and associated contact information can be found on the Shaw Group intranet site, ShawNet.

5.2 Project Responsibility

Employees planning or conducting direct push drilling and soil sampling, or any portion thereof, are responsible for meeting the requirements of this procedure. Employees conducting technical review or oversight of direct push drilling and soil sampling are also responsible for following appropriate portions of this SOP. Project participants are responsible for recording information in sufficient detail to provide objective documentation (field notes, logs, forms, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURES (TECHNICAL REQUIREMENTS)

This section addresses basic requirements and procedures involved with direct push drilling and soil sampling. This section includes information on selection of methods and equipment, planning and preparation requirements, health and safety requirements, drilling and sampling procedures, and key practices for ensuring quality.

Proper drilling and subsurface soil sampling procedures are necessary to ensure the quality and integrity of the samples. The details within this SOP should be used in conjunction with project-specific work plans. The project work plans should generally provide the following information:

- Specific direct push drilling and soil sampling methodologies and equipment to be employed
- Sample collection objectives
- Anticipated locations and total depths of soil borings and target horizons or depths of soil samples to be collected
- Numbers and volumes of samples to be collected
- Types of chemical analyses to be conducted for the samples
- Specific quality control (QC) procedures and sampling requirements

- Detailed direct push drilling and subsurface soil sampling requirements or procedures based upon site-specific conditions and project-specific objectives/requirements

6.1 Selection of Methods and Equipment

The practice of direct push drilling and soil sampling involves numerous variations in methodology and types of equipment. There are few industry-wide standards for direct push drilling and soil boring. Key aspects of the variations in direct push drilling and sampling are as follows:

- **The use of single-wall or dual-wall sampling systems**. Single-wall systems generally provide lower-quality sampling and higher rates of production than dual-wall systems. Single-wall systems can typically be advanced with lower energy sources (i.e., to greater depth) than dual-wall systems because they have smaller area and hence encounter less sidewall friction and tip resistance during advance.

- **Open-hole or cased boring**. *This SOP recommends that borings always be advanced through or with a conductor casing.*

- **Open-barrel or closed (sealed)-barrel sampler**. Open-barrel samplers are open at the bottom at all times, and may fill with slough, lose sample material as they are retrieved, or contribute to or be subject to cross-contamination. Closed-barrel samplers are closed at the bottom until being mechanically opened at a target depth. Closed-barrel samplers reduce the potential for sampling of slough or cross-contamination of the sample.

- **Liner or inner-barrel material**. Inner barrel/sampler tubes should be selected based on the need to see or access samples for lithologic evaluation and the need to perform chemical or other analytical testing. Use of lexan or other see-through materials can be beneficial in identifying soil type or visual indications of contamination (such as petroleum saturation). Some liners, such as lexan, can be quickly cut to select certain sample intervals for testing, and the sample may be retained, shipped, and stored directly in the liner. Liners or sample barrel material should generally not be made of materials that include any of the chemical species that are sought during analysis.

- **Energy source for making the boring**. Energy sources may be static or dynamic, and may include vibratory or sonic systems, hydraulic systems, percussion (hammer) systems, or even rotational systems.

- **Energy source for removing the sampler**. Energy sources may be static or dynamic, and are generally one of the following: hydraulically-lifted rod systems, winch and wire rope systems, or percussive systems (backpounding). This SOP recommends against backpounding as a means of removing samplers, as it tends to disturb samples.

- **Use of checkball or open-top tubes for collection of soil**. Checkball systems prevent fluids that are within the sampling barrel, above the sample, from flowing down into the barrel as the sampler is retrieved. Checkball systems are mostly used when sampling granular soils beneath the water table, to minimize the potential for water to dislodge or alter sample material as the barrel is retrieved.

- **Use of catchers or retainers**. Catchers are used to help retain loose soils within the sampling barrel as it is retrieved. Catchers are most commonly used when sampling granular soils beneath the water table, with variable success.

6.2 Planning and Preparation

Planning for direct push drilling and soil sampling activities involves the following:

- Identifying drilling and sample collection objectives and exact methodologies and equipment to be used for sample collection
- Identifying specific drilling and sampling locations, targeted depths, and specific identification numbers of soil samples to be collected
- Identifying numbers and volumes of samples to be collected
- Specifying types of chemical analyses to be conducted for the samples
- Listing specific quality control (QC) procedures and sampling requirements
- Describing any detailed project-specific sampling requirements or procedures beyond those covered in this SOP, as necessary
- Listing expected soil types, hydrostratigraphy, and/or formations to be encountered (if known)
- Identifying and listing all pertinent health and safety issues and requirements, including those contained in the project-specific health and safety plan(s), relative to work activities (including site utility clearance)
- Compiling main subcontractor requirements for direct push drilling and soil sampling and generating the statement of work to procure subcontractor services

All of the above information and items should be compiled as part of a sampling plan contained within the project work plans. This plan includes detailed, project-specific direct push drilling and soil sampling procedures beyond the basic procedures and requirements in this SOP.

Preparation for direct push drilling and soil sampling activities includes the following:

- Securing all necessary site access, permitting, and plan approvals
- Procuring the appropriate direct push drilling and sampling subcontractor
- Completing all necessary underground utility clearance activities at each of the sampling locations; each location should be cleared according to requirements in appropriate Shaw E & I technical SOPs and the project work plans.
- Briefing the rig geologist, subcontractor personnel, and other site personnel on specific information necessary for effective implementation of the sampling effort (e.g., sampling objectives, locations and depths, project-specific sampling requirements and procedures, pertinent health and safety requirements, etc.)
- Verifying that job personnel have proper health and safety training

The Project Manager, or designee, is responsible for appropriately briefing field personnel, as described above.

6.3 Health and Safety Requirements

Prior to initiating drilling and sampling activities, applicable Shaw E & I and project-specific safety requirements must be reviewed by Shaw E & I site personnel and subcontractors. This review is conducted to familiarize these individuals with specific hazards associated with the site and drilling activities, as well as with health and safety procedures associated with the operation and maintenance of drilling equipment. Such information may be found in the project health and safety

plan and other applicable Shaw E & I policies and procedures, such as HS316, *Drilling Operations*, and HS-308, *Underground/Overhead Utility Contact Prevention*. Additional health and safety requirements include the following:

- Tailgate Safety Meetings should be held in the manner and frequency stated in the project health and safety plan. All Shaw E & I and subcontractor personnel at the site should have appropriate training and qualifications as specified by the project health and safety plan. Documentation should be kept readily available in the project files on site.
- During drilling, all personnel within the exclusion zone should pay close attention to all rig operations. Pushed or driven drill tools can catch or snag loose clothing, causing serious injury.
- Clear communication signals must be established with the drilling crew, since verbal communication may not be heard during the drilling process.
- The entire crew should be made aware to inform the rig geologist when any unforeseen hazard arises or when anyone is approaching the exclusion zone.

6.4 Drilling and Sampling Requirements/Procedures

This SOP cannot present a single, detailed and specific procedure that is applicable to all methods and equipment that are available (Section 6.1) or to the specific sampling objectives of a specific project. An example procedure for direct push drilling and soil sample collection is shown in Attachment 1. The example procedure may be supplemented or customized to provide project-specific requirements and procedures.

Sample quality is easily compromised by poorly selected samples or haphazard drilling and sampling technique. Common problems and suggested solutions include the following:

- Generation of excess slough. Excess sloughing occurs when conductor casing is not used, when soil materials fall out of the sample barrel as it is retrieved, and when soil at or near the ground surface falls into the boring. Slough is excess when the amount that is present hinders the collection of sufficient representative sample volume or mass for the required testing or lithologic analysis.
- Collection of slough for testing or logging. This occurs when a large volume of slough is present in the boring bottom at the time the sampler is emplaced and driven into soil. Because slough is disturbed and from unknown depth, it is unsuitable for logging or testing.
- Disturbance (negatively-biasing) of samples for analysis of Volatile Organic Compounds (VOCs). The act of driving a sampling tube into soil causes compression and some heating of the soil, and can create macroscopic void space, i.e., a microannulus between the soil and sampling tube. Heating, compression of soil, and creation of void space contribute to the migration of gaseous fluids as well as the partitioning of VOCs, such as gasoline or solvent vapors. Although some heating, compression, and formation of microannular space are unavoidable, care should be taken to minimize these phenomena to the extent that is reasonably possible. Some sampling devices and methods are more suitable for analysis of samples for VOCs than others.
- Improper abandonment of borings. Excess slough or caving (the dislodgement and falling of a significant volume of sidewall material) hinders the proper abandonment of a boring. Where this occurs, the borehole should be cleaned out prior to grouting. A tremmie pipe should be used to conduct grout to the bottom of the borehole if a conductor casing is not in place prior to and during grouting.

Additional key practices that will ensure the quality of the samples collected and proper/efficient abandonment of the borings, include the following:

- Drill with a Conductor Casing. Various equipment, systems, and methods exist for direct push drilling and soil sampling. Some systems are open-hole (i.e., do not use conductor casing), hence borings made with these systems are at high risk for slough-related difficulties in logging, sampling, and abandonment. Most systems have provisions for driving down a conductor casing, to keep the boring open and relatively free of slough when the sampler or a plug or drive-point is not present at the bottom of the casing system. **This SOP recommends the use of a method of direct push drilling that integrally includes the advancement of conductor casing as the boring is made**, and further recommends that the conductor casing remain in place during sampling and into the abandonment process.

- Measure the Boring Depth. A weighted tape should be used to verify the depth of the boring within the conductor casing. Measurement should be made with reference to the ground surface. It is important to measure depth at the start of sampling intervals and at total depth (TD) of the boring.

- Clean-Out Excessive Slough. If slough is present, it should be removed by forcing a sampler into it and retrieving and emptying the sampler of slough.

- Identify Slough and Avoid Sampling it or Logging it as In Situ Material. Slough is generally easy to identify based on jumbled internal textures, lighter density, macroscopic and unmineralized void spaces, greater softness and malleability, and decreased cohesion, as compared to in situ material that has not been dislodged prior to the sampling process.

- Grout Through a Conductor Casing. Grouting through a conductor casing prevents any significant accumulation of slough in the boring and ensures that grout will be the predominant material in the borehole, thereby minimizing any potential for vertical migration of fluids in the filled borespace. This minimizes potential liability.

6.5 Documentation

Accurate documentation of the boring, sampling, and abandonment activities is important for interpreting sample results, interpreting boring conditions and lithologic information, and conceptually reconstructing events. Appropriate forms (including boring logs) should be completed in accordance with appropriate Shaw E & I technical SOPs and project-specific requirements/procedures.

6.6 Technical Review

All direct push drilling and soil sampling specifications, procedures, and results (e.g., reports, forms, etc.) should undergo technical review. It is recommended that the technical reviewer also provide review/oversight of the actual field implementation of direct push drilling and soil sampling activities. This should include aiding in troubleshooting for drilling and sampling problems. The technical reviewer should be an experienced senior geologist or hydrogeologist. At a minimum, the technical reviewer should be a person capable of planning and supervising direct push drilling and associated sampling and well installation programs. Individuals needing assistance in finding qualified technical reviewers may consult internal Shaw technical listings for experts in drilling or direct push drilling and sampling.

Any issues raised during the technical review shall be resolved between the reviewer and the staff planning, conducting, or preparing results of direct push drilling and soil sampling activities, as follows:

- Comments/issues that arise relative to planning and developing detailed procedures for direct push drilling and soil sampling should be resolved before mobilization and drilling commences.

- Comments/issues that arise relative to the results of drilling and sampling activities should be resolved before external (i.e., outside of Shaw E & I) use or submission of the results.

The technical review comments and issues, and corresponding resolution, shall be documented and filed with the project records. Such records should be maintained until project closeout.

7. ATTACHMENTS

- Attachment 1, Example Direct Push Drilling and Soil Sampling Procedure

8. FORMS

None.

Attachment 1
Example Direct Push Drilling and Soil Sampling Procedure

The following procedure is provided as an example. It should be customized based on project/site-specific equipment, methodology, and sampling and quality control requirements. This procedure is written for a direct push drilling rig that uses a small-diameter conductor casing with a 3-foot long inner wireline sample barrel (with a 3-foot long acrylic liner) connected to the bottom of the casing. The casing and associated sample barrel are driven, pushed, or vibrated into the ground in 3-foot increments. Soil samples are collected into the acrylic sample tubes as the conductor casing and sample barrel are advanced into the formation. The samples inside the liner and sample barrel are then retrieved with a wireline, leaving the conductor casing in place. Soil samples are thus continuously collected until the total depth of the boring is reached. The example procedure consists of the following:

1. Decontaminate the direct push sampling rig and associated sampling equipment before mobilizing to the first sample location, in accordance with applicable Shaw E & I technical SOPs and/or project-specific requirements/procedures.

2. Inspect the direct push rig to make sure the equipment is properly maintained, adequately decontaminated, and determined capable of achieving the objectives for drilling (equipment advancement), sample collection, and abandonment of the boring (to be done by the driller and rig geologist).

3. Calibrate all field analytical and health and safety monitoring equipment according to the instrument manufacturer's specifications and/or project work plans. Calibration results must be recorded on the appropriate form(s) as specified by the project work plans or health and safety plan.

4. Wear the appropriate personal protective equipment, as specified in the project work plans or health and safety plan. Personal protection will typically include, at a minimum, a hard hat, safety glasses, gloves, steel-toed boots, hearing protection, and coveralls.

5. Remove the surface cover (e.g., concrete, asphalt, etc.) at the drilling/sampling location according to the project work plans.

6. Once the direct push rig is sited at the sampling location, make sure the location is free of underground utilities, as per the project work plans and Shaw Policy and Procedure HS308, *Underground/Overhead Utility Contact Prevention*. Manually probe or excavate near-surface soils (as required) as an additional step to avoid underground utilities or structures.

7. Learn the drilling equipment heights and dimensions necessary to independently determine the boring or sampler depth while observing the work (to be done by the rig geologist). Such information includes lengths of rods, casing, barrels, and other in-ground equipment; the length of strokes or advances; and the height from ground surface to "full down" stroke of the direct push rig.

8. Between each sampling location and prior to each sampling run, decontaminate the sampling equipment according to applicable Shaw E & I technical SOPs and/or project-specific procedures.

9. Inform the driller of the expected total depth, the first and expected additional sampling depths, the likelihood of encountering groundwater or NAPL, and any contingency or opportunistic decisions that are anticipated (such as contingency-sampling or increased total depth).

10. Record the type of sampler assembly on the appropriate form(s) as specified in appropriate Shaw E & I technical SOPs or the project work plans. To minimize off-gassing of volatiles, the sampler should not be advanced/pushed until the sampling team is ready to process the sample.

11. Commence drilling and sample collection by advancing the conductor casing and associated sample barrel (with liner) for the first 3-foot increment.

12. Pull the wireline sampling string up from the bottom of the borehole and remove the sample barrel. Make sure that each sample barrel is retrieved as quickly and smoothly as possible. Record the depth interval for each sample drive as the sample barrel is being retrieved.

13. Remove the acrylic liner containing the soil sample from the sample barrel.

14. Observe and record the amount of sample recovery on the appropriate form(s), according to applicable Shaw E & I procedures and/or the project work plans. Any observed field problems associated with the sampling attempt (e.g., refusal) or lack of recovery should be noted on the appropriate form.

15. Select the appropriate portion of the liner containing the sample to be cut and be submitted for laboratory analysis. Such selection should be based on the following factors: (1) judgment that the sample represents relatively undisturbed intact material, not slough; (2) volume/length of sample required for analysis; (3) minimal exposure to air; (4) lithology; and (5) obvious evidence of contamination. The project work plans should specify the volume/length of sample to be submitted for specific analyses and confirm the selection factor(s).

16. Place Teflon™ film over each end of the liner containing the samples to be submitted for chemical analysis and seal each end with plastic end caps. Do not use any type of tape to seal the cap, because tape causes a toluene interference. All samples should be individually stored in resealable plastic bags. Note: Additional project-specific sample preparation steps or modifications may be required as stated in the project work plans.

17. Appropriately label and number each sample to be submitted for analysis according to applicable Shaw E & I technical SOPs and the project work plans. The label will be filled out using waterproof ink and may contain, at a minimum, the following information:

    - Project number
    - Boring number
    - Sample number
    - Bottom depth of sleeve
    - Date and time of sample collection
    - Parameters of analysis
    - Sampler's initials

18. Document the sampling event on the appropriate form(s), as specified in the project work plans. The information listed on the form(s) should, at a minimum, include the following:

    - Project name and number
    - Date and time of the sampling event
    - Sampling methods used – specify sample type
    - Sample number
    - Sample location
    - Sample depth interval
    - Sample description (type of matrix)
    - Weather conditions
    - Unusual events, including lack of water or insufficient water volume in sampler
    - Signature or initials of sampler

19. Appropriately preserve, package, handle, and ship the sample in accordance with applicable Shaw E & I technical SOPs and/or project-specific procedures. The samples shall also be maintained under custody. Samples stored on site will be subject to the provisions of applicable Shaw E & I procedures and/or project requirements. All reasonable attempts should be made to ship samples on the date they are collected.

20. Cut/split the remaining acrylic liner to expose the remaining soils for logging. The descriptions of the soil and preparation of a boring log should follow applicable Shaw E & I technical SOPs and project-specific requirements/procedures. The soil boring log should include the following information:

    - Borehole location
    - Name of the drilling company and driller
    - Dates and times when drilling began and when it was completed
    - Lithologic data and descriptions from soil samples
    - Sampling depths and recovery of soil samples

21. Continue to advance the borehole in 3-foot increments and collect soil samples to the total depth. As the borehole is advanced, the rig geologist will generally do the following:

    - Observe and monitor rig operations
    - Conduct all health and safety monitoring and sampling and supervise health and safety compliance
    - Prepare a boring log from cuttings or soil samples according to applicable Shaw E & I technical SOPs and project-specific requirements
    - Document drilling progress and other appropriate observations on appropriate forms
    - Supervise the collection and preparation of any soil, soil vapor, or groundwater samples

    The rig geologist should not leave the drill site while drilling operations are being conducted and the borehole is being advanced.

22. As drilling progresses, the rig geologist should observe and be in frequent communication with the driller regarding drilling operations. Conditions noted should include relative rates of penetration, flowing sands, drilling refusal, changes in equipment, etc. These conditions should be recorded on the appropriate logs and forms in accordance with applicable Shaw E & I technical SOPs and/or the project work plans. Drilling should not be allowed to progress faster than the rig geologist can adequately observe conditions, compile logs, and supervise safety and sampling activities.

23. The rig geologist should also observe the make-up and tightening of connections as additional conductor casing joints are added to the drill string. Any observed drilling problems and causes, including significant down time, should be recorded on the appropriate forms.

24. Cuttings (i.e., left over soil samples) and fluid containment during drilling should be observed and supervised by the rig geologist as per the project work plans.

25. Periodically measure the boring depth with a weighted tape to verify its depth. If it cannot be directly measured, then count rods or pipe lengths that have been inserted into the ground or take other action to verify depth (in a manner that is independent of asking the driller the boring depth).

26. If the borehole is to be abandoned once drilling and sampling is completed, follow procedures outlined in applicable Shaw E & I technical SOPs and the project work plans. The abandonment will be supervised by the rig geologist. If the borehole contains slough, the slough should be removed prior to abandonment.

27. If a monitoring well is to be installed in the borehole, follow appropriate Shaw E & I technical SOPs and project-specific requirements/procedures. The well installation will be supervised by the rig geologist.

28. After drilling, sampling, and well installation or borehole abandonment is completed, lay the conductor casing down and move the rig off of the location. The rig geologist or appropriate designee will supervise demobilization/site restoration. Additional demobilization requirements/ procedures are as follows:

    - All debris generated by the drilling operation should be removed and disposed of appropriately.
    - The site should be cleaned, the ground washed as necessary, and the site conditions restored according to the project work plans.
    - All abandoned borings should be topped off and completed as specified by the project work plans. All wells should also have their surface completions finished as specified by the project work plans.
    - Any hazards remaining as a result of drilling activities should be identified and appropriate barriers and markers put in place, as specified by the project health and safety plan.
    - All soil cuttings and fluids should be properly contained, clearly labeled, and maintained in compliance with the project work plans and/or other applicable requirements.

29. Complete all appropriate forms and documentation as required in the project work plans.

Appendix B

Forms

Shaw The Shaw Group Inc.

JOB SAFETY ANALYSIS
TAILGATE SAFETY MEETING
COMBINATION FORM

JOB#:

JSA Date:

Date Revised:

Project name:	ACTIVITY DESCRIPTION:
Client:	
Preparer(s):	
EMERGENCY INFO (list below or attach) Hospital Name: Address: Phone: Ambulance Phone: Emergency Evacuation route: Assembly point:	Supervisor: Initials: Time of inspection: Comments:
Initial Required PPE:	

PRINCIPLE TASKS, STEPS	POTENTIAL HEALTH/SAFETY HAZARDS	RECOMMENDED CONTROLS

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS

Tailgate Safety Meeting Conducted by: Date: Time:

OTHER TOPICS DISCUSSED:	ATTENDEES' Printed Names	ATTENDEES' Signatures

Shaw™ Shaw E & I

CHAIN OF CUSTODY

Ref. Document # _____

Page _____ of ___

Project Number: _____

Project Name / Location: _____

Purchase Order #: _____

Shipment Date: _____

Waybill/Airbill Number: _____

Lab Destination: _____

Lab Contact Name / ph. #: _____

Project Contact: _____ (Name & phone #)

Send Report To: _____

Phone/Fax Number: _____

Address: _____

City: _____

Sampler's Name(s): _____

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Container type	Preservative						Analyses Requested									Turn Around Time Requested
		Date	Time	G/C				HCL	NaOH	HNO_3	H_2SO_4	Ice											

Special Instructions:

QC/Data Package Level Required:

I II III IV/Project Specific: _____

Relinquished By:	Date:	Received By:	Date:
	Time:		Time:
Relinquished By:	Date:	Received By:	Date:
	Time:		Time:
Relinquished By:	Date:	Received By:	Date:
	Time:		Time:

G/C Codes

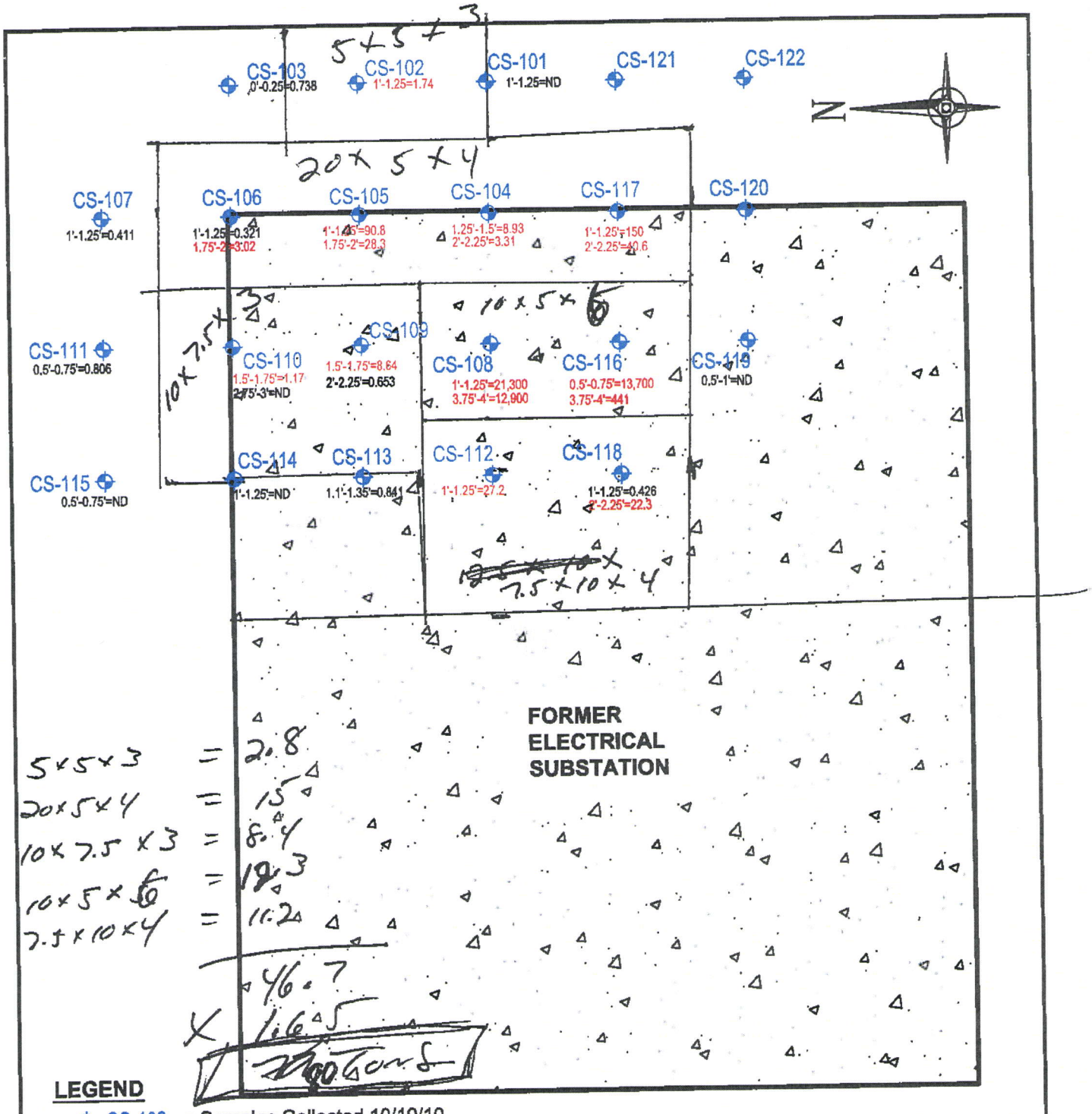
C = Composite G = Grab

Matrix Codes

DW = Drinking Water	SO =Soil
GW = Ground Water	SL = Sludge
WW = Waste Water	CP = Chip Samples
SW = Surface Water	WP = Wipe Samples
LIQ = Other Liquid	SOL = Other Solid
AS = Air Sample	SED = Sediment

Appendix C

Historic Data



LEGEND

CS-102 = Samples Collected 10/19/10

1.5'-1.75'=8.64
2'-2.25'=0.653
= Sample Depth and Results (Red = Impact Above Most Stringent EPA Remediation Objective)

Date: November 2010 Scale: 1" = 5' Drawn by: SP Checked by: JK	**Exhibit III: Proposed Sampling Plan** Former GST Steel Facility Tract F-7 Kansas City, MO
COMPASS BIG BLUE, LLC 8116 Wilson Road Kansas City, Missouri 64125	

TABLE A

Soil Analytical Results
PCBs

Compass Big Blue - Tract F-7
8116 Wilson Road
Kansas City, Missouri

Analyte	*EPA Remediation Objectves*		Sample Date	CS-101	CS-102	CS-103	CS-104	CS-104	CS-105	CS-105	CS-106
	Low Occupancy	High Occupancy	Depth (feet)	10/19/10 1'-1.25'	10/19/10 1'-1.25'	10/19/10 0'-0.25'	10/19/10 1.25'-1.5'	10/19/10 2'-2.25'	10/19/10 1'-1.25'	10/19/10 1.75'-2'	10/19/10 1'-1.25'
PCB-1016	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1	25		0.882	**1.74**	0.738	**8.93**	**3.31**	**90.8**	**28.3**	0.321

NOTES:

1. All results expressed in milligrams per kilogram.
2. ND = Not Detected at or above adjusted reporting limit.
3. Samples were analyzed utilizing EPA Method 8082.
4. **Bold values** = Concentration exceeds EPA Low Occupancy remediation objective.
5. [ ] = Concentration exceeds EPA High Occupancy remediation objective.

TABLE A

Soil Analytical Results
PCBs

Compass Big Blue - Tract F-7
8116 Wilson Road
Kansas City, Missouri

Analyte	*EPA Remediation Objectves*		Sample Date	CS-106	CS-107	CS-108	CS-108	CS-109	CS-109	CS-110	CS-110
	Low Occupancy	High Occupancy	Depth (feet)	10/19/10 1.75'-2'	10/19/10 1'-1.25'	10/19/10 1'-1.25'	10/19/10 3.75'-4'	10/19/10 1.5'-1.75'	10/19/10 2'-2.25'	10/19/10 1.5'-1.75'	10/19/10 2.75'-3'
PCB-1016	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1	25		ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1	25		**3.02**	0.411	**21,300**	**12,900**	**8.64**	0.653	**1.17**	ND

NOTES:

1. All results expressed in milligrams per kilogram.
2. ND = Not Detected at or above adjusted reporting limit.
3. Samples were analyzed utilizing EPA Method 8082.
4. **Bold values** = Concentration exceeds EPA Low Occupancy remediation objective.
5. [ ] = Concentration exceeds EPA High Occupancy remediation objective.

TABLE A

Soil Analytical Results
PCBs

Compass Big Blue - Tract F-7
8116 Wilson Road
Kansas City, Missouri

	EPA Remediation Objectves		**Sample**	CS-111	CS-112	CS-113	CS-114	CS-115	CS-116	CS-116	CS-117	CS-117
			Date	10/19/10	10/19/10	10/19/10	10/19/10	10/19/10	10/19/10	10/19/10	10/19/10	10/19/10
Analyte	**Low Occupancy**	**High Occupancy**	**Depth (feet)**	0.5'-0.75'	1'-1.25'	1.1'-1.35'	1'-1.25'	0.5'-0.75'	0.5'-0.75'	3.75'-4'	1'-1.25'	2'-2.25'
PCB-1016	1	25		ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1	25		ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1	25		ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1	25		ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1	25		ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1	25		ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1	25		0.806	**27.2**	0.841	ND	ND	**13,700**	**441**	**150**	**40.6**

NOTES:

1. All results expressed in milligrams per kilogram.
2. ND = Not Detected at or above adjusted reporting limit.
3. Samples were analyzed utilizing EPA Method 8082.
4. **Bold values** = Concentration exceeds EPA Low Occupancy remediation objective.
5. [ ] = Concentration exceeds EPA High Occupancy remediation objective.

TABLE A

Soil Analytical Results
PCBs

Compass Big Blue - Tract F-7
8116 Wilson Road
Kansas City, Missouri

Analyte	*EPA Remediation Objectves*		Sample Date	CS-118	CS-118	CS-119
	Low Occupancy	High Occupancy	Depth (feet)	10/19/10 1'-1.25'	10/19/10 2'-2.25'	10/19/10 0.5'-1'
PCB-1016	1	25		ND	ND	ND
PCB-1221	1	25		ND	ND	ND
PCB-1232	1	25		ND	ND	ND
PCB-1242	1	25		ND	ND	ND
PCB-1248	1	25		ND	ND	ND
PCB-1254	1	25		ND	ND	ND
PCB-1260	1	25		0.426	**22.3**	ND

NOTES:

1. All results expressed in milligrams per kilogram.
2. ND = Not Detected at or above adjusted reporting limit.
3. Samples were analyzed utilizing EPA Method 8082.
4. **Bold values** = Concentration exceeds EPA Low Occupancy remediation objective.
5. [ ] = Concentration exceeds EPA High Occupancy remediation objective.

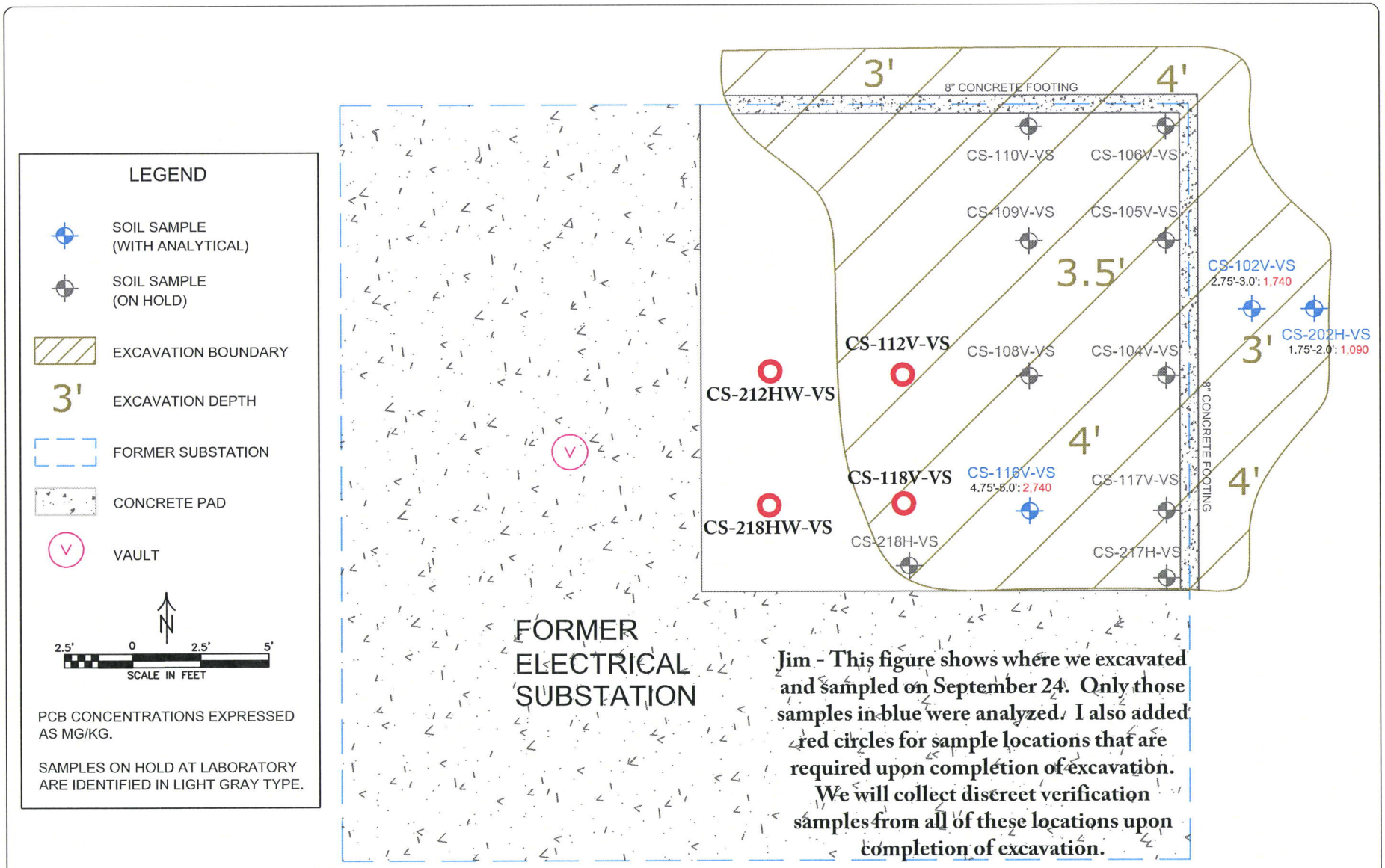


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FIGURE 3

Excavation Details Map

Former GST Steel Facility
Tract F-7
Kansas City, MO

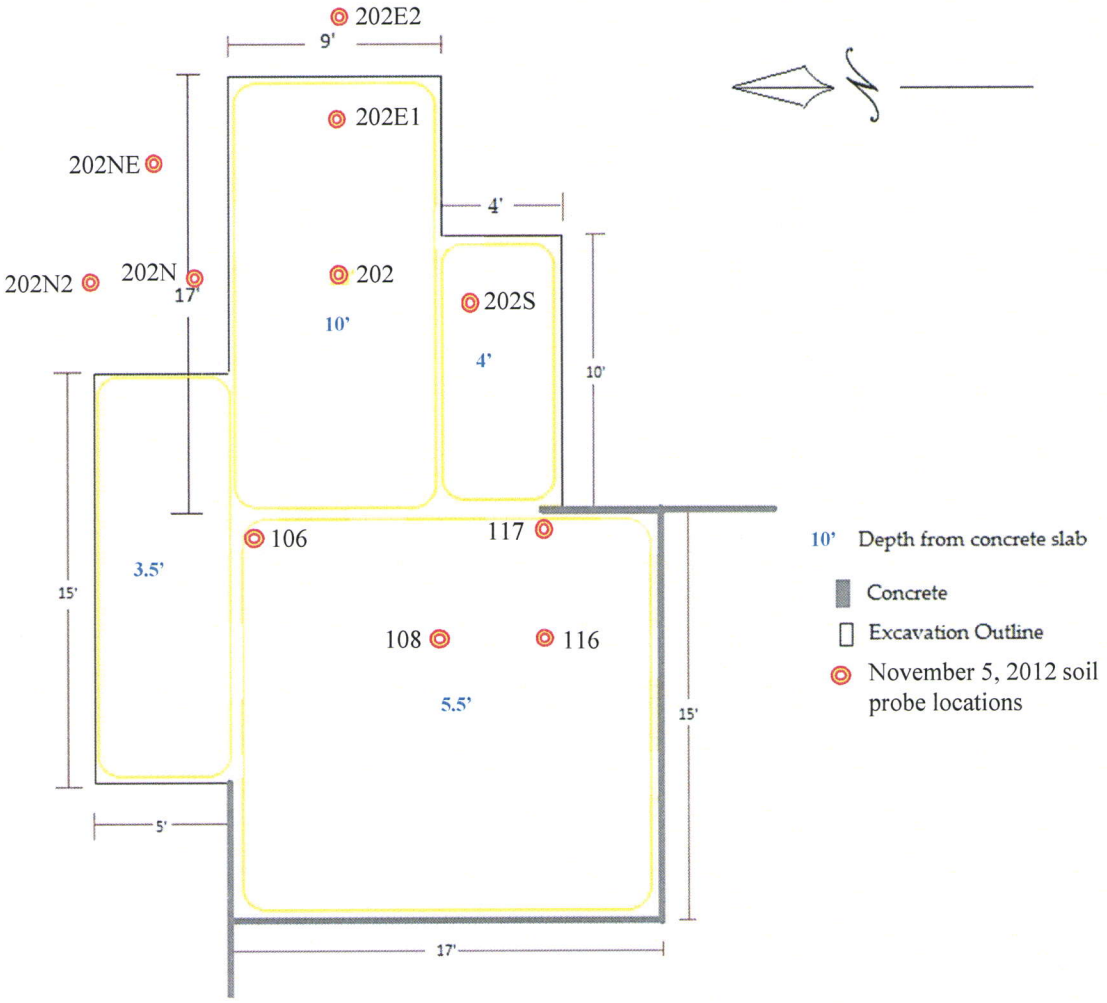
DRAWN BY: MM	PROJECT NUMBER: 12-8973-220	FILE NAME: Excavation Details.dwg	DATE: 09/28/12

Table 1
Soil Analytical Results
Soil Characterization
Former GST Facility / Tract F-7
Kansas City, Missouri

Sample ID	Sampled Depth (ft)[1]	Date Sampled	PCBs[2] Mobile Lab	PCBs[4] Fixed Lab
High Occupancy Use Cleanup Level			1	
106	**6 - 7**	11/05/12	0.29	<1.0
	9 - 10	11/05/12	0.60	NA
108	6 - 7	11/05/12	**1.48**	NA
116	14 - 15	11/05/12	**2.27**	NA
	16 - 17	11/05/12	0.84	1.0
117	8 - 9	11/05/12	**3.77**	NA
	9 - 10	11/05/12	0.46	NA
202	**11 - 12**	11/05/12	**>24**	**190**
	14 - 15	11/05/12	**2.68**	NA
	15 - 16	11/05/12	0.44	**7.2**
202N	11 - 12	11/05/12	**offscale**[3]	NA
	14 - 15	11/05/12	0.03	NA
202N2	11 - 12	11/05/12	0.04	NA
202S	5 - 6	11/05/12	**7.17**	NA
	11 - 12	11/05/12	0.12	NA
202E1	**11 - 12**	11/05/12	0.02	<1.0
202NE	5 - 6	11/05/12	**offscale**	NA
	11 - 12	11/05/12	**1.45**	NA

All concentrations expressed as mg/kg (ppm)
(1) - Depth measured from approximate elevation of concrete slab
(2) - PCBs analyzed by mobile gas chromatograph using Aroclor 1260 standard.
(3) - 'Offscale' indicates that the concentration exceeded maximum concentration of detection range
(4) - PCBs analyzed by fixed laboratory using SW-846 Method 8082A - tabulated concentrations are Aroclor 1260
NA - Not analyzed
Sample results shown in **bold** exceeded HOU Cleanup Level of 1 mg/kg
Sample depths shown in **bold** are samples that were split for fixed lab analysis

10/17/12



Excavation measurements and dimensions prepared by DeNovo

SOIL PROBE LOCATIONS

FORMER GST STEEL FACILITY
TRACT F-7
KANSAS CITY, MISSOURI

DATE: 11-05-12	SCALE: N/A
PROJECT NO: 12-9328-220	

WCEC
ENVIRONMENTAL CONSULTANTS

Attachment 5
Agency Directive

Agency Directive

Shaw Environmental, Inc. (Shaw), a CB&I company, under the authorization of Mile Rail, LLC is currently conducting a site investigation to delineate the extent of PCBs in the soil at the former GST Steel facility located at 8116 Wilson Road in Kansas City, Missouri. The release of PCBs were the result of vandalism occurred at a small electrical substation located at the far east extent of the property. Initial investigation and remedial activities were conducted by Compass Big Blue prior to Shaw's involvement in November 2012. PCBs were delineated to the north property boundary where PCB concentrations exceeded the Low Occupancy Limit of 25 mg/kg. Access to the adjacent Union Pacific right-of-way is necessary to delineate the north extent of PCBs in the soil. The site is located near the K.C. Terminal near milepost 1-50N/R32W section 31south of the Neff yard.

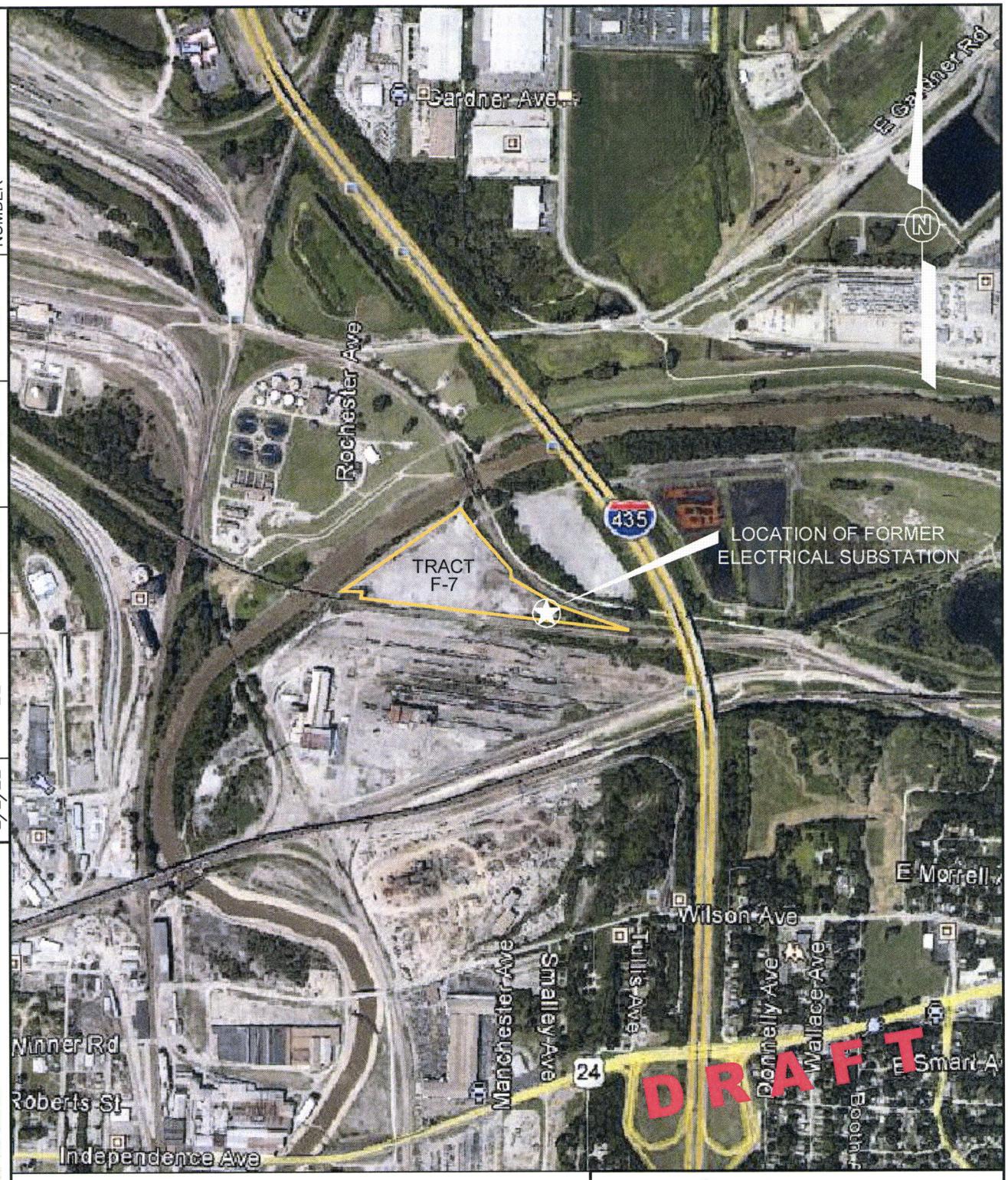
Investigation a remedial activities are conducted under the regulator oversight of the Region 7 U.S Environmental Protection Agency. Investigation and remedial activities conducted at the site are regulated under TSCA Self-Implementing Cleanup and Disposal of PCB Remediation Waste stipulated under 40 CFR 761.61.

Mile Rail Contact Information
Glen Schwartz, President
Mile Rail, LLC
Environmental + Rail
8116 Wilson Road
Kansas City, MO 64125
773.619.4556 direct
866.562.1217 fax
gschwartz@milerail.com

U.S. EPA Region 7 Contact Information
Bruce A. Morrison, Remedial Project Manger
11201 Renner BLVD
Lenexa, KS 66219
913-551-7755 direct
Morrison.Bruce@epa.gov

Missouri Department of Natural Resources Contact Information
Christine Kump-Mitchell
Hazardous Waste Program
7545 S. Lindberg, Suite 210
St. Louis, Missouri 63125
christine.kump@dnr.mo.gov

Attachment 6
Relevant Maps



DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
-/-/--	--	--	--	--	501167070-A1

File: O:\Project\501167070\501167070-A1.dwg
User: greg.jones Nov 21, 2013 - 1:01pm Layout: Site Location

SCALE

0 1000 2000 FEET

REFERENCE:

GOOGLE EARTH

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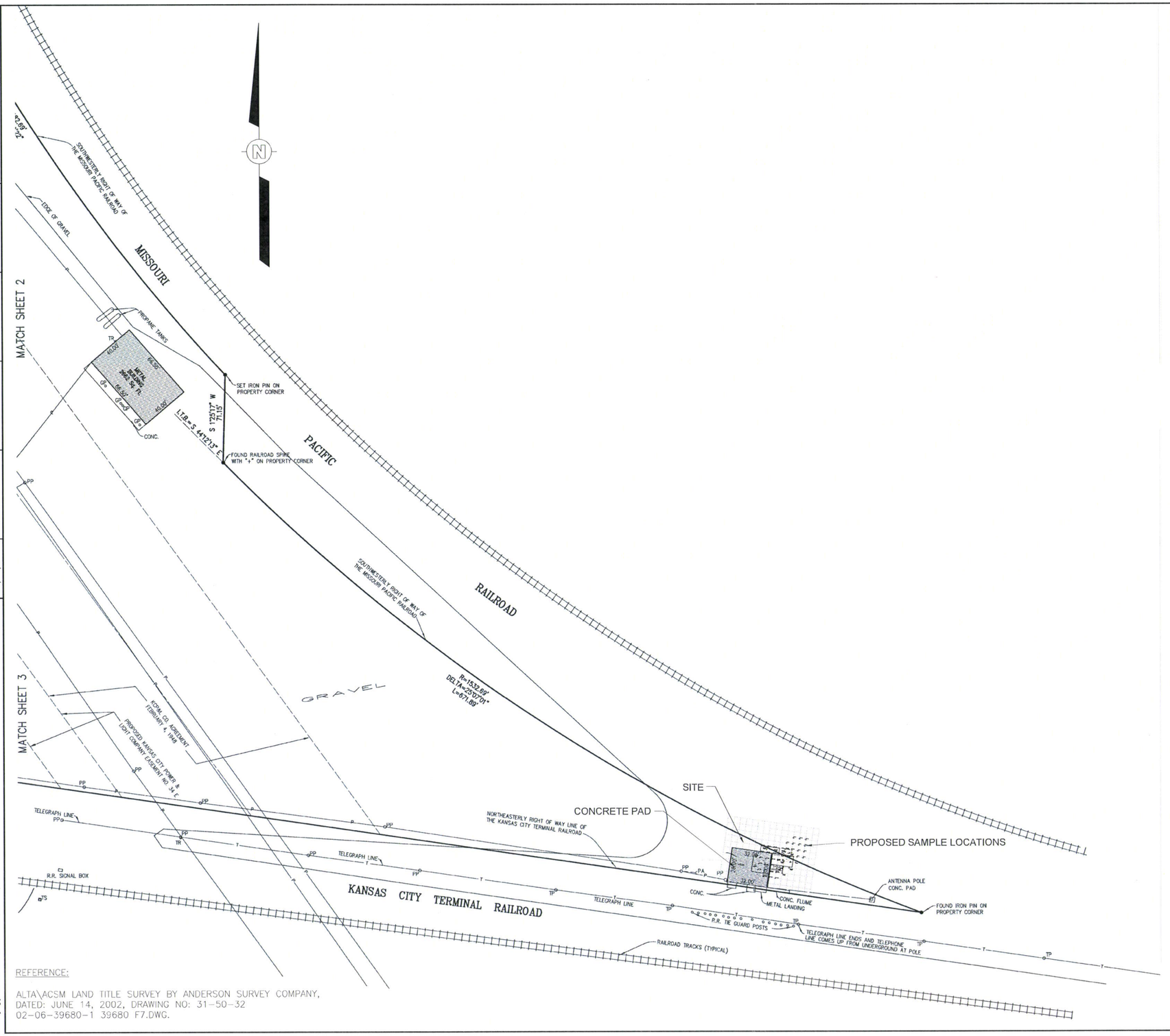
MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 1

SITE LOCATION MAP

FORMER GST STEEL
KANSAS CITY, MISSOURI

DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
-/-/--	--	--	--	--	501167070-D2



REFERENCE:

ALTA\ACSM LAND TITLE SURVEY BY ANDERSON SURVEY COMPANY, DATED: JUNE 14, 2002, DRAWING NO: 31-50-32 02-06-39680-1 39680 F7.DWG.

SCALE
0 40 80 120 FEET

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 2
SITE PROPERTY BOUNDARY
FORMER GST STEEL
KANSAS CITY, MISSOURI

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User: greg.jones Nov 21, 2013 - 2:46pm Layout: 22 x 34 - Report

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE
501167070-B4	--	--	--	--	-/-/--

COMPOSITE 1		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	4.7 mg/Kg	5/21/13

COMPOSITE 3		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1.7 mg/Kg	5/21/13

EXCAVATION 2–1		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	13 mg/Kg	6/18/13

CHIP 3		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1,100 mg/Kg	4/3/13

EXCAVATION 2–2		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	3 mg/Kg	6/18/13

EXCAVATION 2–3		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1.9 mg/Kg	6/18/13

COMPOSITE 2		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	27 mg/Kg	5/21/13

COMPOSITE 4		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	3.5 mg/Kg	5/21/13

EXCAVATION 2–4		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	1.7 mg/Kg	6/18/13

EXCAVATION 2–5		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	4.7 mg/Kg	6/18/13

CHIP 4		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	99 mg/Kg	4/3/13

CHIP 2		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	2.1 mg/Kg	3/13/13

CHIP 5		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	10 mg/Kg	4/3/13

CHIP 1		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	7.4 mg/Kg	3/13/13

CHIP 6		
ANALYSES PCBS BY SW8082A	RESULT	COLLECTION DATE
AROCLOR 1260	42 mg/Kg	4/3/13

CS–115 CS–111 CS–107 CS–114 CS–110 CS–106 CS–103 CS–113 CS–109 CS–105 CS–102 CS–112 CS–108 CS–104 CS–101 CS–118 CS–116 CS–117 CS–121 CS–119 CS–120 CS–122

COMPOSITE 1 COMPOSITE 2 COMPOSITE 3 COMPOSITE 4

3'-6" 5'-6" 10'-0" 4'-0"

15'–0" 12'–0" 5'–0" 17'–0" 28'–0" 9'–0" 4'–0" 10'–0" 15'–0" 33'–0"

202N2 202NE 202N 202 202E1 202E2 202S

CHIP 1 CHIP 2 CHIP 3 CHIP 4 CHIP 5 CHIP 6

CONCRETE PAD

APPROXIMATE LOCATION OF VAULT

APPROXIMATE VAULT MANHOLE LOCATION

SCALE 0 5 10 FEET

LEGEND:

- PREVIOUS SAMPLE LOCATION
- PREVIOUS SAMPLE LOCATION
- COMPOSITE SAMPLE LOCATION
- NORTHEAST PAD AREA – EXCAVATION 1
- EAST AREA – EXCAVATION 2
- NORTH – EXCAVATION 3
- SOUTHEAST AREA – EXCAVATION 4
- CONCRETE CHIP SAMPLE LOCATION

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 3
CONCRETE PAD AND FILL MATERIAL SAMPLE RESULTS
FORMER GST STEEL
KANSAS CITY, MISSOURI

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User: greg.jones Nov 21, 2013 - 2:12pm Layout: Layout1-11 x 17

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE
501167070-B7	--	--	--	--	-/-/--

LEGEND:

- PREVIOUS SAMPLE LOCATION
- CONFORMATION SAMPLE, PCB CONCENTRATION IN mg/kg
- CHARACTERIZATION SAMPLE, PCB CONCENTRATION IN mg/kg
- PROPOSED OFF SITE CHARACTERIZATION SAMPLE
- PCB CONCENTRATION IN SOIL >25 mg/kg

REFERENCE:

REFERENCE ALL DRAWINGS FROM OTHER SOURCES HERE.

SCALE

0 6 12 FEET

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MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 4

PROPOSED OFF SITE SAMPLE LOCATIONS

FORMER GST STEEL
KANSAS CITY, MISSOURI

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User: greg.jones Nov 21, 2013 - 2:15pm Layout: Layout1-11 x 17

LEGEND:

- FORMER SUBSTATION
- EXCLUSION ZONE SECURITY FENCE
- DECONTAMINATION AREA
- TRACT F-7

N

0 25 50 100

Feet

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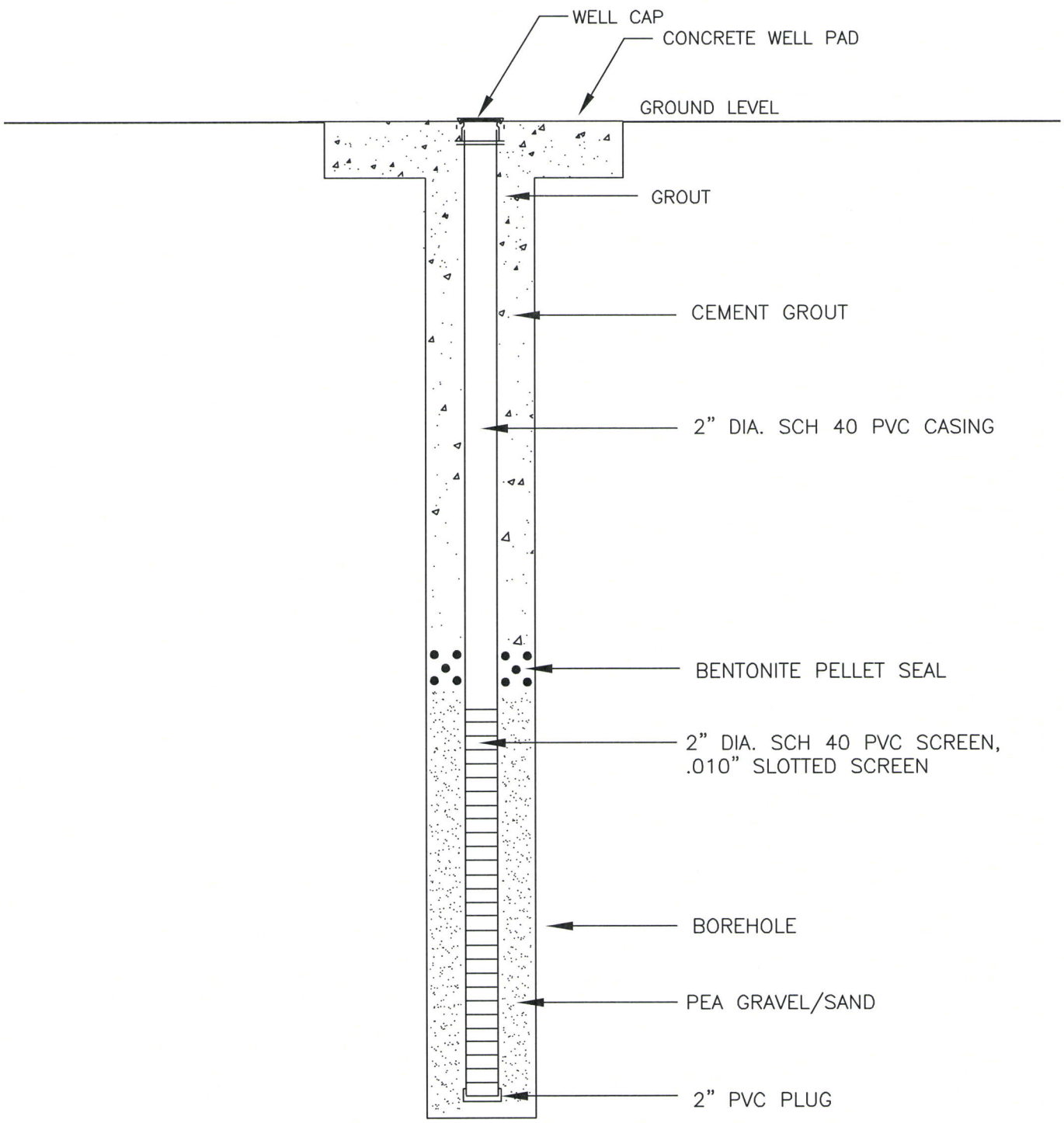
MILE RAIL, LLC
KANSAS CITY, MISSOURI

FIGURE 5
SITE DETAILS MAP
FORMER GST STEEL
KANSAS CITY, MISSOURI

Attachment 7
Monitoring Well Design



TYPICAL FLUSH MOUNT MONITORING WELL

NOT TO SCALE

7330 W. 33RD STREET N., SUITE 106
WICHITA, KANSAS 67205
(316) 220-8020

Shaw Environmental & Infrastructure, Inc.
(A CB&I Company)

flushmount

Attachment 8
Railroad Protective Liability Insurance

Proof of Railroad Protective Liability Insurance with all required coverage will be submitted with the agreement at the time of execution.